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Seventh Annual Conference
on
Elementary Supervision

Held at Indiana University

April 17, 1930

Bureau of Coöperative Research, Indiana University
School of Education

HENRY LESTER SMITH, Director

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Program of Conference on Elementary Supervision

April 17, 1930

Morning Session, Thursday, 9:30 a.m.

Miss Blanche Fuqua, Elementary Supervisor, Terre Haute, presiding

9:30. Address of Welcome. President William Lowe Bryan, Indiana University.

9:45. An Experiment with a Free Reading Hour. Mrs. Caroline Maie Wildrick, Sixth Grade Critic Teacher, Indiana University.

10:15. The State Course of Study in Arithmetic. Harold Littell, Graduate Assistant, School of Education, Indiana University.

10:45. Measurement and the Curriculum. Wendell W. Wright, Professor of Education, Indiana University.

Afternoon Session, Thursday, 2:00 p.m.

Miss Frances Mason, Elementary Supervisor, South Bend, presiding

2:00. Laboratory Studies of Reading. G. T. Buswell, Professor of Education, University of Chicago.

2:45. Knowledge of Arithmetic Possessed by Young Children. Clifford Woody, Director of Bureau of Educational Reference and Research, University of Michigan.

Evening Session, Thursday, 8:00 p.m.

H. M. Whisler, Director, Division of Teacher Training, State Department of Public Instruction, presiding

As in former years the program for the evening session of the conference was arranged by, and was in charge of, the State Director of Teacher Training.

Topic: The Supervision of Reading and Arithmetic in the Elementary School.

From the standpoint of the special supervisor. Miss Blanche Fuqua, Elementary Supervisor, Terre Haute; Miss Frances Mason, Elementary Supervisor, South Bend.

From the standpoint of the general supervisor. C. C. Underwood, Supervisor of Elementary Schools, Indianapolis.

An Experiment with a Free Reading Hour

MRS. CAROLINE MAIE WILDRICK, Sixth Grade Critic Teacher, Indiana University

DURING the spring of 1929, at the suggestion of Dr. W. W. Wright, it was agreed to undertake an experiment with a free reading hour.

Generally, reading is taught by the study and recitation method. It has been suggested by the State Committee in Language and Arts and by others that the upper elementary grades should have an opportunity to do more free reading.

In the free reading hour as it was developed in this experiment, we attempted to set up a practice about as far removed from the study-recitation method of teaching reading as could be. It is not presumed that the free reading hour which we have used is our own idea of the best method of teaching reading in the sixth grade. In this case, we chose to compare two methods that are widely different.

It is needless to describe in detail the ordinary recitation in reading. The teacher assigns the lesson, the pupils study the assignment, and questions are asked. In addition, the teacher encourages children to read books from the school and public library to supplement their regular reading lessons. For this study-recitation period, forty minutes are given.

The free reading hour is far different in procedure. During the forty-minute period, the pupils have to meet but two requirements: first, they must read; and second, they must keep a record of what they read. The object of such a free reading hour was to allow the children to read whatever they desired and to have such reading displace all other reading instruction during the time in which the experiment was conducted.

In this discussion, the experimental group refers to the sixth grade group taught by the free reading hour method. The control groups refer to the sixth grade groups taught by the study-recitation method. All groups were taken from regular classes of the Bloomington elementary schools. The experiment began September, 1929, and extended to June, 1930. Results of the experiment as discussed in this report are based upon three factors: first, the opinions of participating children; second, the amount of material read by the experimental group compared with the amount read by the control groups; and third, the gain in achievement by the two groups based upon standardized reading tests given at the beginning of the experiment and at the end of the year.

We shall first describe typical room conditions of the experimental group during the free reading hour. Then we shall tell how the ma-

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chinery was set up for the conduct of the experiment and how the reading interests of the children shifted from one subject to another. Finally, we shall discuss in detail the results and point out the conclusions reached at the end of the experiment.

On entering the room, when the experimental group was having its free reading hour, one first became aware of the almost perfect quiet—there was no slow lifeless oral reading, characteristic of the study-recitation method. Pupils were reading silently. Here was a girl deeply interested in a book dealing with the people of India, with a story of early pioneer life, or with the history of the Egyptians. There was a boy comfortably seated on a newspaper spread on the floor in the corner of the room. He had a boy's magazine and was reading an exciting aviation story. There in another corner of the room, was a boy seated on some steps poring over a volume of Greek history. Here was a girl seated on a chair at a table reading the *News Outline*. Occasionally, a pupil finished what he was reading and quietly returned his book and then searched thru the shelves or among the magazines for something that appealed to his reading taste or that would assist him in the study of his geography or history lesson. There was no confusion; there were no discipline cases; everyone was at work, each reading that which most interested him. There was no memorizing of poems, no analyses, no halting pronouncing difficulties, not even a question concerning what had been read. There was not a taint of a reading text with a collection of abridged stories, short poems, and incomplete stories; not a hint of compulsion, but entire freedom to read complete books with one story running thruout the book in the natural grown-up fashion.

To make selection of reading material by pupils as free as possible, a large number of books and magazines had to be provided. Thru the coöperation of Superintendent R. E. Tirey, Professor Velorus Martz of Indiana University, Miss Cottingham, principal of Central School, Miss Ashby, city librarian, Miss Davidson, Junior-Senior librarian, and Mr. Armstrong, elementary school librarian, over a thousand books whose range of interest was suitable for children from fifth to ninth grade ability were collected. These books were classified into groups: fiction, history, fairy tales, geography, inventions, poetry, science, *Book of Knowledge*, Compton's *Pictured Encyclopedia*, etc. They were arranged alphabetically in groups according to authors and placed on shelves specially built in the room for this purpose. Under each group of books, was tacked a card with the name of the group classification as: fiction, history, science, nature study, etc. The books were numbered in such a manner that the children could replace them on the shelves in the proper place.

In the back of each book was a pocket in which was kept a book card with the number, author, and title of the book. When a child selected a book to read, he wrote his name on the card and filed it according to the number. When he had finished reading the book, the card was found and put into the pocket and the book placed on the shelf in its position.

The next thing was to make out a reading card and file it after his name which was arranged alphabetically in the Reading Card File.

On this card, the child wrote his name, the name of the author of the book, the title of the book, the number of pages, and the date completed.

Several magazines were subscribed for and many donations of current magazines were made each month by different persons and organizations. The complete list included forty-eight magazines. A check was kept on magazine articles read by having the child write on a reading card the name of the magazine, date published, name of the article, and date read.

You may be interested in knowing what these children selected to read from this collection of over a thousand books and about fifty magazines. During the first few weeks, we found that the children were reading fiction. They craved stories and were devouring page after page of well-written and interesting stories. Soon, however, the interest shifted. The 6B's began to search out stories and history of the Egyptians, Phoenicians, Chaldeans, Persians, and Greek life. It was not difficult to discover the reason, for their history lessons were being supplemented by the reading hour. The 6A's looked for American history to parallel their history lessons. They also became intensely interested in anything they could find concerning India for in their geography work, they had planned an imaginary trip thru India—had written letters to the children there, and had been entertained by Mr. Joseph, a native of India, who showed slides of his native country and gladly answered any questions the children had cared to ask.

In a short time, in the 6B class, the interest had shifted to the geography of Europe. Some were reading about Italy, others about France, Spain, Russia, Germany, and Denmark. Perhaps this was due to the fact that the geography class had decided to divide itself into committees and each committee was to be responsible for a sight-seeing trip thru Europe. Now and then a child would be seen to supplement something he had read by consulting the *World Book*. The children were busy using their free reading hour to correlate reading and geography.

Between these periods of centered interest created by work in other subjects, the children were found to be rather evenly distributing their time among the various types of material in the library. The boys for the most part gave science sketches and stories especial emphasis while the girls devoted more time to reading fiction.

To show the amount of reading done by the pupils during the free reading hour, the summary of a typical reading card is given here:

NAME: *Mary Heacox.*

	Books Outside Library	Books in Library	Pages in Library Books	Magazine Articles Read
First Semester.....	16	24	4,890	85
Second Semester.....	8	21	5,852	229
Total	24	45	10,742	314

A tabulation of magazines listed on the reading cards of boys and girls in the experimental group shows the following magazines listed in the order of frequency of use:

Boys	*Girls*
1. *News Outline*	1. *News Outline*
2. *Popular Mechanics*	2. *The American Girl*
3. *Boy's Life*	3. *Every Girl's*
4. *The American Boy*	4. *National Geographic*
5. *Scientific American*	5. *Junior Home*
6. *National Geographic* .	6. *Travel*
7. *Travel*	7. *Child Life*
8. *St. Nicholas*	8. *St. Nicholas*
9. *Junior Home*	9. *Scientific American*
10. *Red Ranger*	10. *Popular Mechanics*
11. *Out-Door Life*	11. *The American*

Table I shows the fields in which the children in the experimental group did their reading. The first column indicates the number of books of each type on the shelves of the library that were read by one or more pupils. The second column indicates the number of times boys selected and read books from each type or classification. The third column indicates the number of times girls selected and read books from each type or classification. The last column is the total for both boys and girls. It can be seen from this table that boys were more interested than girls in books on history, animals, inventions, North American travel, birds, and individual biography. Girls were more interested than boys in books on citizenship, European travel, fairy tales, and fiction.

TABLE I—NUMBER OF BOOKS READ UNDER EACH CLASSIFICATION AND COMPARISON OF TYPES OF READING DONE BY BOYS AND GIRLS OF THE EXPERIMENTAL GROUP

Type of Book	Number Books Read	Boys	Girls	Total
Readers	24	83	98	181
Religious	3	14	10	24
History (General)	61	338	227	565
Health-Hygiene	11	43	31	74
Animals	19	106	72	178
Citizenship	5	29	31	60
Poetry	10	42	37	79
Inventions	9	76	49	125
Nature Study	7	31	26	57
North America (Travel)	4	33	14	47
Europe (Travel)	17	73	80	153
Birds	9	21	9	30
Fairy Tales	17	107	176	283
Geography (General)	5	19	18	37
Biography (Collateral)	11	39	32	71
Biography (Individual)	15	42	11	53
Fiction	162	980	1,113	2,093
Total	389	2,076	2,034	4,110

In this report, we shall discuss the results obtained under three heads: (1) interest and opinion of the children participating in the experiment; (2) amount of material read by these children and comparison of this amount with that read by other sixth grade children in the city; and (3) comparison of testing results with 6A and 6B control groups.

First, were the children interested? Did they like this method of reading instruction? They gave every evidence of such an agreeable attitude. They looked forward to the reading hour with great pleasure. As soon as recess was over and the sound of, "It's time for the reading hour," was spoken, one could see a happy group of boys and girls moving about the room, some checking books in, others selecting books and magazines to check out and still others with books and magazines in hand seating themselves at reading tables, at desks, or on chairs—any place in the room that they might choose. If, on occasion, the pupils were deprived of their reading hour for a day, they insisted upon their right to a double period on the following day.

At the close of the first semester, 43 pupils who had been in the experimental group were given a sheet of paper and told to indicate which method they liked the better, the free reading hour or the ordinary recitation period. They were to give as many reasons as they could think of for their decision. In order to gain as great freedom as possible in their choice and in their reasons, they were told not to place their names on the papers when they handed them in. Of the 43 pupils, 37 preferred the free reading hour to the recitation period. Three indicated that they saw no difference and that they saw just as good points to the one method as to the other. Only three indicated that they liked the recitation period better than the free reading hour. The reasons for preferring the free reading hour are interesting and significant. Half of the 37 pupils liked the free reading hour because they could read that which they wanted to. Eight saw the value of the free reading hour in connection with work in other subjects. Seven gave the general reason that such procedure gave one a better education. Other reasons given in the order of frequency of mention are as follows: "more stories to read," "more time to read," "learn about other people," "other stories to read than what you have in your desk," "don't have to answer questions over what you have read," "may read as much as you care to," "don't have to read the same story as the others," "other stories are more interesting," "may sit anywhere and be comfortable," "like to read slowly," "more grown-up," "like to read silently better," and "not so noisy."

This list of reasons for liking the free reading hour better than the recitation period gives ample evidence that the objectives of freedom and self-direction of reading were attained to a rather remarkable degree.

Three reasons were given by those three people who preferred the recitation period to the free reading hour. They are: "children do not get their lessons and read library books," "some of the stories in the

reader are not finished and you must go to the public library to finish them," and "enjoy recitation itself."

The second basis for judging the results of this experiment has been stated as that of amount of material read by the experimental group and a comparison of this amount with that read by other sixth grade children in the city.

A comparison of the amount of reading done by pupils in the experimental group and by pupils in the control groups during the first semester is shown in Table II.

TABLE II—COMPARISON OF AMOUNT OF READING DONE IN THE 6TH GRADE BY THE PUPILS IN THE EXPERIMENTAL GROUP AND BY THE PUPILS IN THE CONTROL GROUPS—FIRST SEMESTER

Groups	6B	6A
A. Experimental Group—		
1. Total pages read by pupils from books in the school library during free reading period and out of school hours	173,618	80,253
2. Pages per pupil	5,987	5,732
3. Pages per pupil per day	75	72
4. Magazine articles read by pupils	4,807	2,265
5. Magazine articles per pupil	166	162
6. Magazine articles per pupil per day	2	2
7. Books from school library read by pupils during free reading period and out of school	869	365
8. Books read per pupil	30	26
9. Books from other sources than school library read by pupils outside of school hours	188	101
10. Average number per pupil	6	7
11. Total books read by pupils	1,057	466
12. Books per pupil	36	33
B. Control Group No. 1—		
1. Books read outside of regular text	189	554
2. Books read per pupil	17	21
C. Control Group No. 2—		
1. Books read outside of regular text	x	337
2. Books read per pupil	x	13

At the end of the first semester, twelve pupils were promoted into the room as 6B pupils. These pupils during the second semester read a total of 317 books or an average of 26 books per pupil. Of this number, 293 books were from the school library and 24 from the outside sources. A total of 67,987 pages were read by these 12 pupils making an average of 5,665 pages per pupil. Counting 80 days to the semester, this number would average 70 pages per pupil per day. In addition, these pupils read 2,839 magazine articles, an average of 236 per pupil. The data for this group are shown in Table III. Comparative data from the 6B grade in the control groups were not obtained for the second semester.

The group which entered the 6B grade last fall is the only group upon which data are available for the entire school year. By obtaining the total from Tables II and III, it can be seen that the experimental group read a total of 1,836 books during the school year, an average of 63 books per pupil. Meanwhile, the control group read a total of 328 books or an average of only 28 books per pupil.

TABLE III—COMPARISON OF AMOUNT OF READING DONE IN THE 6TH GRADE BY THE PUPILS IN THE EXPERIMENTAL GROUP AND BY THE PUPILS IN THE CONTROL GROUP—SECOND SEMESTER

Groups	6B	6A
A. Experimental Group—		
1. Total pages read by pupils from books in the school library during free reading period and out of school hours	67,987	164,039
2. Pages per pupil	5,665	5,657
3. Pages per pupil per day	70	70
4. Magazine articles read by pupils	2,839	5,818
5. Magazine articles per pupil	236	200
6. Magazine articles per pupil per day	3	2
7. Books from school library read by pupils during free reading period and out of school	293	651
8. Books read per pupil	24	23
9. Books from other sources than school library read by pupils outside of school hours	24	128
10. Average number per pupil	2	4
11. Total books read by pupils	317	779
12. Books per pupil	26	27
B. Control Group No. 1—		
1. Books read outside of regular text	x	139
2. Books read per pupil	x	11

Of course, these figures are very unreliable. It is not claimed that the number of books read is a reliable index of the amount of reading done by a child. These comparisons, however, seem to show that those in the experimental group did considerably more reading than did those in the two control groups.

The third basis for judging the results of the experiment is the comparison of testing results with control groups. During the first semester, the experimental group consisted of 37 pupils in the 6B grade, and 16 pupils in the 6A grade. Control group No. 1 consisted of 15 pupils in the 6B grade and 30 pupils in the 6A grade in one school, and control group No. 2 consisted of 36 pupils in the 6A grade in another school. During the second semester, the experimental group consisted of 12 pupils in the 6B grade and 26 pupils in the 6A grade. Control group No. 1 consisted of 13 pupils in the 6A grade.

Initial tests were given to all of these children at the time of the beginning of the experiment in September. Each child was given Form

V or W of the New Stanford Reading Test and Form A or B of the Sangren-Woody Reading Test. At the end of the first semester in January, 1930, each child was given the form of the New Stanford Reading Test and the form of the Sangren-Woody Reading Test that he or she had not taken in the initial test. At the end of the second semester in June, 1930, the children were tested again with the same tests. The same form was used for each child that was used in the initial test.

Thruout the time the experiment was in progress there was the difficulty of the admission of new pupils who were forced by program exigencies into the experimental and control groups, but whose records on the tests were incomplete. These were consequently omitted altogether. In making up the records at the end of each semester, all data for pupils who had not been in any one of the groups for the full semester or who had not taken all the tests were discarded. For the first semester, this reduced the number in the 6B grade to 29 in the experimental group and to 11 in control group No. 1, and in the 6A grade to 14 in the experimental group and to 26 and 25 in control groups No. 1 and No. 2, respectively. For the second semester, the number in the 6B grade was reduced to 12 in the experimental group; in the 6A grade to 26 in the experimental group and to 10 in control group No. 1.

Thru the coöperation of the University Department of Psychology, the intelligence percentile of each child was obtained and the experimental groups and the control groups in each grade were equated on the basis of age, intelligence percentile, and beginning test score. It was thought that perhaps the experiment might have different effects on the achievement of children of different intelligence levels. Each equated group, therefore, was divided into three intelligence levels: the lowest 25 per cent, the middle 50 per cent, and the highest 25 per cent.

Since the 6A pupils during the first semester were promoted out of the room into Junior High School in January, and a group of 6B children came into the room from the grade below, only the 6B pupils at the beginning of the year were in the experiment for the two full semesters. The results of the experiment on this group will be discussed first.

The Sangren-Woody Reading Test is divided into seven parts, each testing a particular phase of reading. Graphs 1, 2, 3, 4, and 5 illustrate the gain or loss in scores between Test C and Test A, for the high, middle, and low intelligence levels of the equated group, the average for the equated group, and the average for all pupils in the experimental and control groups, and in addition they indicate the grade achievement in each of the seven phases tested.

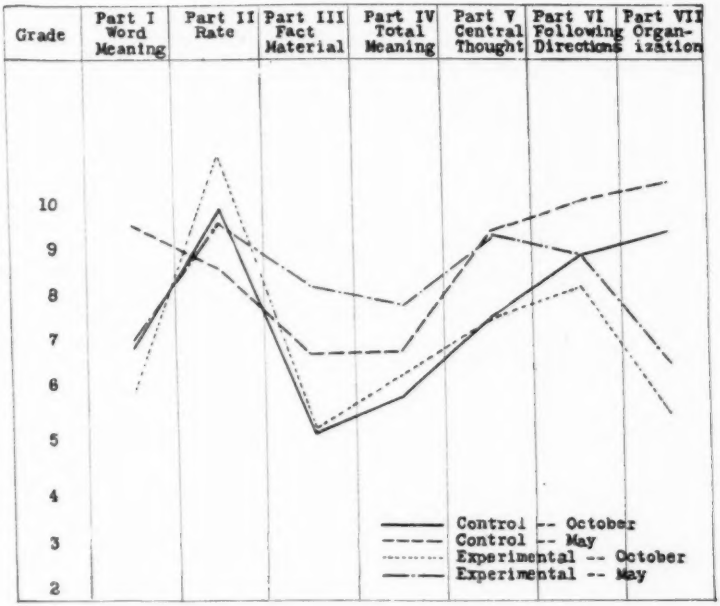

FIGURE 1. READING PROFILE CHART OF AVERAGES OF EQUATED GROUPS FOR 6B-6A PUPILS.

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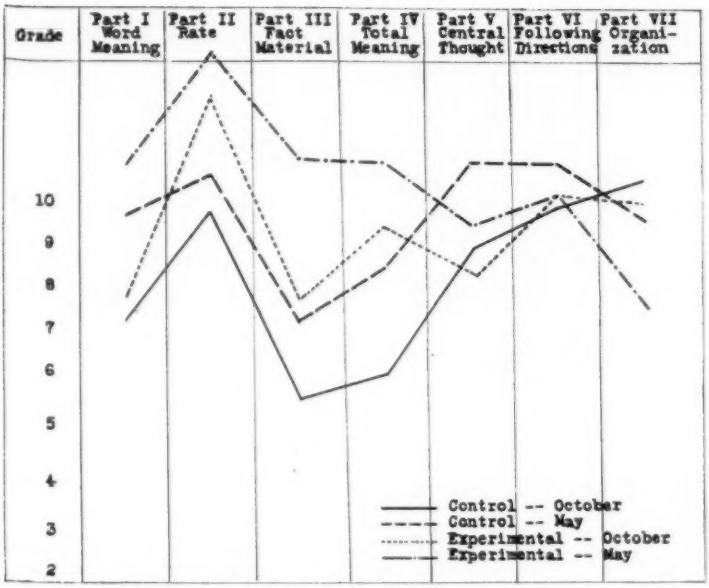

FIGURE 2. READING PROFILE CHART OF UPPER TWENTY-FIVE PER CENT IN INTELLIGENCE OF EQUATED GROUPS FOR 6B-6A PUPILS.

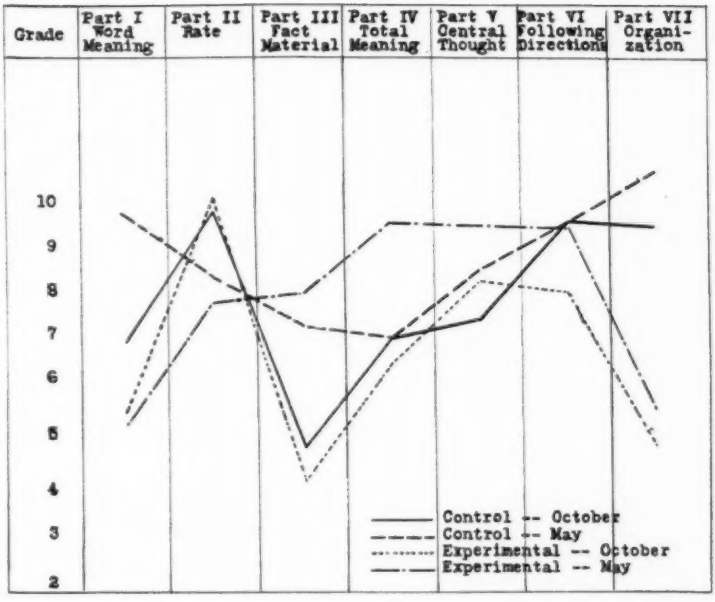

FIGURE 3. READING PROFILE CHART OF MIDDLE FIFTY PER CENT IN INTELLIGENCE OF EQUATED GROUPS FOR 6B-6A PUPILS.

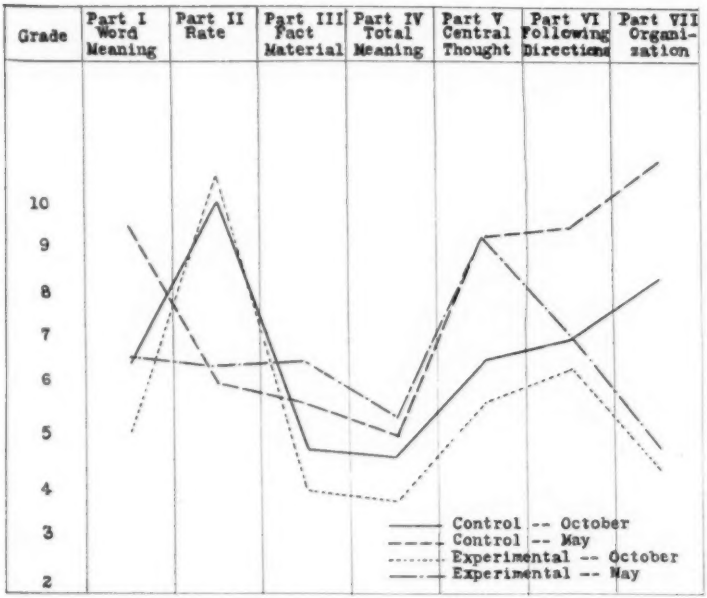

FIGURE 4. READING PROFILE CHART OF LOWER TWENTY-FIVE PER CENT IN INTELLIGENCE OF EQUATED GROUPS FOR 6B-6A PUPILS.

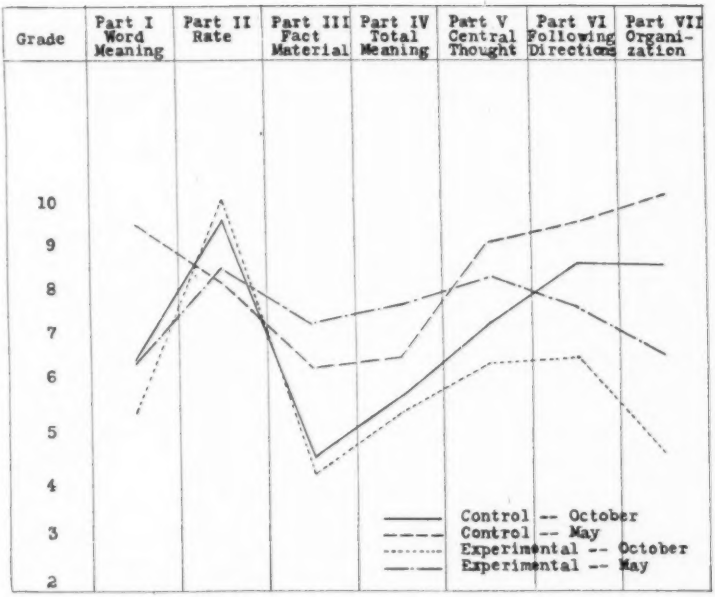

FIGURE 5. READING PROFILE CHART OF AVERAGE OF ALL PUPILS IN THE EXPERIMENTAL AND CONTROL GROUPS FOR 6B-6A PUPILS.

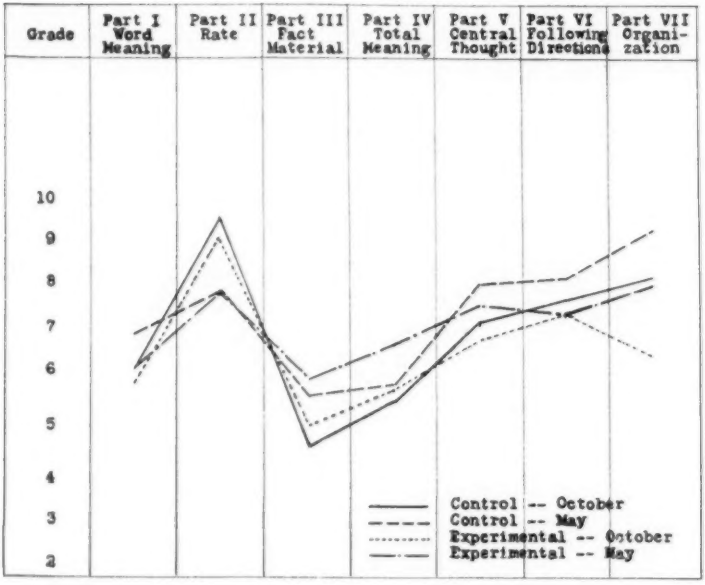

FIGURE 6. READING PROFILE CHART OF AVERAGE OF ALL PUPILS IN THE EXPERIMENTAL AND CONTROL GROUPS FOR ONE SEMESTER.

The New Stanford Reading Test was also given to the pupils in the experimental and control groups at the beginning of the year (Test A), at the end of the first semester (Test B), and at the end of the second semester (Test C).

Paragraph Meaning, Test 1, consists of a number of paragraphs which the child is to read and interpret by filling in a blank or blanks near the close of the paragraph. The content of the preceding part of the paragraph indicates the word or words to be filled in the blanks. This part of the test seems to be different in the thing tested from any part of the Sangren-Woody Test. The pupils in the experimental group did as well, on the average, as the pupils in the control group. However, on the basis of intelligence the recitation method produced slightly greater achievement for the high group and slightly less achievement for the low group.

Word Meaning, Test 2. This part of the test is somewhat similar to Part I of the Sangren-Woody Test and the results are comparable. The experimental method seemed distinctly superior to the recitation method especially for the section high in intelligence.

On the whole, the total test scores on this test showed that the experimental method was superior to the recitation method and especially for the section high in intelligence.

A detailed comparison of the achievement made by the experimental and control groups of 6A and 6B pupils for both semesters failed to discover any significant differences other than those already noted. The averages for all pupils are given in Table IV. Graph 6 shows the average gain during one semester for all pupils in the experiment on each of the parts in the Sangren-Woody Test. From the table and this graph, it can be seen that, on the whole, the experimental method produced greater achievement than the recitation method in rate of reading, fact material, total meaning, and organization. However, only one difference, that in paragraph meaning in the New Stanford Reading Test, was great enough to be of any note, and in that case, the recitation method seemed to be superior to the experimental method.

TABLE IV—AVERAGE SCORE BY ALL PUPILS IN EXPERIMENTAL AND CONTROL GROUPS ON ALL PARTS OF THE TEST AND GAIN OR LOSS ON EACH PART

Part	Experimental			Control		
	Begin Test	End Test	Gain	Begin Test	End Test	Gain
Sangren-Woody						
Word Meaning	20.1	21.1	—1.0	21.3	24.6	—3.3
Rate	26.2	22.8	—3.4	27.1	22.9	—4.2
Fact Material	7.0	9.1	2.1	6.4	8.1	1.7
Total Meaning	6.7	7.7	1.0	6.5	6.8	.3
Central Thought	4.9	5.6	.7	5.1	6.0	.9
Following Directions	6.3	6.3	0.0	6.8	7.1	.3
Organization	6.4	8.0	1.6	8.1	9.4	1.3
Total	77.6	80.6	3.0	81.3	84.9	3.6
New Stanford						
Paragraph Meaning	80.0	81.1	1.1	79.8	86.5	6.7
Word Meaning	76.5	80.4	3.9	80.0	84.7	4.7
Total	156.5	161.5	5.0	159.8	171.2	11.4

Two examples are given to indicate what individual pupils accomplished as a result of the free reading hour. One 6B boy, 11 years, 1 month of age, with an intelligence percentile of 98 read during the year a total of 89 books, 73 of which were from the school library. These 73 books contained a total of 16,756 pages, an average of over 100 pages per day. In addition, he read 583 magazine articles. His beginning test score on the New Stanford Reading Test was 216, indicating the ability of a boy 16 years, 8 months of age, and of a grade above that of a high school sophomore. His final test score was 232, that of a boy 18 years, 2 months of age.

Another 6B boy, 11 years, 11 months of age, with an intelligence percentile of 53 read a total of 34 books. These books contained a total of 4,726 pages, an average of about 30 pages per day. In addition, he read a

total of 399 magazine articles. His beginning test score was 125, indicating an ability of a boy 10 years, 10 months of age, and just beginning the fifth grade. His final score was 153, an ability of a boy 12 years, 1 month of age, and one quarter of the way thru the sixth grade.

Conclusions

1. The educational age of the pupils considered in this study was considerably above the average as indicated by the norms for the beginning test scores.

2. The average gain made by the experimental group was slightly lower than that made by the control groups. The difference, however, was not sufficient to appear significant. Equating of groups on the basis of age, intelligence percentile, and beginning test scores revealed the same difference.

3. The low 25 per cent in intelligence made greater achievement in fact material, total meaning, and central thought by the experimental method.

4. The middle 50 per cent made greater achievement in fact material, total meaning, and following directions by experimental method.

5. The high 25 per cent made greater achievement in word meaning, fact material, and organization by the experimental method.

6. Pupils in the experimental group read considerably more than did pupils in the control groups.

7. Pupils now think they like the free reading hour method better than the study recitation hour.

8. There is evidence that pupils in the experimental group acquired certain habits and skills not measured by the tests used.

The State Course of Study in Arithmetic

HAROLD LITTELL, Graduate Assistant, School of Education, Indiana University

THE revision of the various courses of study for the public schools in Indiana was begun in 1928 under the direction of the State Department of Public Instruction. Among the first subjects selected for revision in the elementary group was Arithmetic, or Elementary Mathematics. The formulation of this course of study was undertaken by a representative committee appointed by Mr. Roy P. Wisehart, the State Superintendent of Public Instruction. The personnel of this committee was as follows:

Miss Frances Mason, Supervisor of Elementary Schools, South Bend
Dr. Wendell W. Wright, Professor of Education, Indiana University
Mr. John G. Rossman, Superintendent of Schools, East Chicago
Miss Myrtle Roark, Elementary School Principal, Lebanon
Mr. Harry Llewellyn, Superintendent of Kosciusko County Schools, Warsaw
Miss Eleanor O'Connor, Elementary Supervisor, Huntington
Miss Hazel Naylor, Elementary Teacher, Hammond
Miss Mary Sappington, Kindergarten Teacher, Peru
Professor Clem O. Thompson, Professor of Elementary Education, Ball State Teachers College

Making use of all the resources available, the committee began an inventory of its work. I might say there are two avenues of approach open to any curriculum committee. One is to develop a "cut and paste" type of course of study; a second is to develop a course based upon sound criteria and approved experimental evidence. This committee, I am happy to say, chose the latter type.

An attempt was made to attack the problem from various angles. First, the committee itself attempted to determine and draw up the general objectives of arithmetic. Second, the problem was attacked from the teaching field. Here the committee attempted to get certain information relative to (*a*) grade placement and (*b*) the time to begin the formal study of arithmetic. Third, school executives and administrators were asked to assist in solving the problem. The committee was able to secure from these sources many courses of study, both city and state types. Fourth, seminars were developed at Indiana University and its Extension Center at Indianapolis by Dr. Martz and Dr. Wright. Likewise similar seminars were organized at Ball State Teachers College in Muncie, under Professor Scarf, of that institution.

From the material secured thru all these sources, the course of study in tentative form was developed. It was subsequently printed and placed in the hands of the teachers of the state for their use last September (1929).

During the current school year certain studies were undertaken to develop further the content of the course, as well as further to increase its validity.

Seminars were again organized in Bloomington and in Indianapolis to work out much more in detail the expected outcomes and step difficulties involved in the various units of the various grades, as well as to study the methods of teaching procedure. These seminars have taken the form of developing each of the units on the basis of utilizing individualized instruction material.

Some of these units are now being used in actual practice. The unit on percentage, number 3, of Grade VI, was one of the numbers which was especially well developed. It is now being tried out experimentally in three different schools of Bloomington. The unit on fundamental processes, in Grade V, is also being tested out in one room in the Central School of that city. The unit on banking and the unit on fractions are being used as individual instruction material, from an experimental standpoint, in the schools of Indianapolis and Pendleton, respectively.

From these studies the committee hopes to secure the following information relative to the units under consideration:

1. The outcomes of their attainment on a 100 per cent achievement or mastery basis.
2. The value of individual instruction techniques on method.
3. The time that is necessary for students of varying abilities to complete this unit of work. (The only way in which time allotment is to be experimentally ascertained is to determine how much time it takes the various pupils to achieve the different units of work on a 100 per cent mastery basis.)

We are now determining the actual amount of time that is necessary for students of varying ability to complete, on a mastery basis, the unit on percentage mentioned above, including the first and second cases, in the sixth grade. We now feel reasonably sure that for this and some other few units at least we can write time allotments which are based not only upon experimental evidence but also upon sound, common-sense theory.

It is realized that the timing of the units of work is a slow, tedious process considering the fact that in all there are thirty-two units of work in the whole course, and at the end of the present year not over one-sixth of these will have definitely determined time limits worked out.

You can thus see that the program set out by the arithmetic committee is one for several years' study and experimentation, and not one that can be attained in any short period of time.

A third method of attack has been the matter of determining suggestive methods of procedure by a thoro analysis of all experimental data

thus far developed in the field of elementary number work. It might be said that, while seemingly much has been accomplished along this line, when a detailed analysis is made one finds that experimental study has only touched the "high spots," so to speak. However, if all the arithmetic facts, procedures, principles, etc., were now based upon sound experimental evidence, which they are not, two difficulties would still present themselves to the curriculum-maker. The first of these would be to apply, or rather to set, these experimentally determined principles over against life situations in problem solving. The second would be to convince the average experienced teacher that the other way (whatever that way happens to be) is not the right way to do the thing.

It is our problem to overcome immediately the first of these difficulties by try-out or experimental processes. The second may be compelled to wait a generation or so for full accomplishment.

Perhaps I can make this clearer if I use an example. There is considerable evidence, from the standpoint of the learning process, that a child should be taught to add downward, or from top to bottom of a column of figures. Experimental evidence proves that this is true. Yet, in spite of such evidence many of us perhaps teach the other method (viz., adding upwards), and why? Well, that is the question.

Experimental treatises on such phases of arithmetic as "the relative difficulty of the number combinations," "analyses of methods of attacking addition examples," "the relative difficulty of subtraction combinations," "methods of subtraction," "errors in subtraction," "reasoning in arithmetic," etc., are but a few of the many experimental studies already made which are being used in the development of our course of study. This conference is very fortunate in having on its program a man who has done much along this line, viz., Dr. Buswell.

Books on methods in the teaching of arithmetic, teachers' manuals, magazines, and work books are likewise being analyzed to the best of our ability to give every teacher the best possible means of attack in the matter of developing effectively the outcomes set forth.

The fourth mode of attack on the problem of development of a course of study, and one which I am convinced is going to prove one of the most fruitful of all, is the evaluation of the various tentative units of the course by the teachers of the state themselves.

This work was undertaken with the consent of the committee, by Dr. Wright, under the direction of the State Superintendent of Public Instruction, in coöperation with the Bureau of Coöperative Research of Indiana University. The evaluation sheet, a copy of which I have placed at your disposal, was developed by Dr. Wright and myself and approved by the committee. I shall not go into detail as to our method of procedure in securing the data. Suffice to say that both the school administrators and the teachers themselves entered into the project enthusiastically and willingly as the subsequent data will show.

After all, one of the most important points in determining how any course of study is functioning or not functioning is to get the reactions of those who are, day by day, using it in actual classroom work.

The following brief statistical summary may be of interest:

NUMBER OF PERSONS COÖPERATING IN THE STUDY

	Number Asked to Coöperate	Number Who Agreed to Coöperate
County Superintendents	92	52
City Superintendents	93	42
Town Superintendents	51	19
Total—Superintendents	236	113
County Teachers	1,522	960
City Teachers	608	490
Town Teachers	90	65
Total—Teachers	2,220	1,515

An examination of the folder will show that we have attempted to secure from each teacher a rather detailed statement of one, and only one unit of work. The returns tend to show that this was not an unwise move.

The evaluation blank was divided into three major parts:

1. Evaluation of the general directions.
2. Evaluation of the unit proper.
3. Miscellaneous or added information which the teacher might give.

Part I of this study includes the following items:

a. Guiding principles of curriculum revision.
b. Statement of the committee.
c. General objectives.
d. Psychological principles.

Returns on these four items indicate almost unanimous agreement on the "set-up" as given in the course itself. This fact was very gratifying to the committee who felt that they could proceed with the detailed unit construction as based upon commonly accepted criteria.

Part II of the evaluation blank, "Evaluation of the unit proper," includes the following major items:

a. Evaluate the unit as to objectives.
b. Would you modify any of the aims?
c. What pupil activities have you found most useful? Can you add others?
d. What per cent of your pupils have achieved mastery in the expected outcomes? Would you eliminate any of the outcomes? Would you add others?
e. What teaching procedures listed have you found most valuable? Least valuable?

It is unnecessary for me to say that we have secured many valuable suggestions relative to the various points enumerated in this part of the study. Some of the original expected outcomes will be eliminated, others modified, and still others added, because of this direct study. Especially helpful has been the item on suggested teaching procedures.

Many concrete examples, such as lesson plans, tests, illustrative materials, etc., have been returned with the questionnaires themselves. The third part of the study was devoted to the following miscellaneous items:

a. Time used to complete the unit.
b. Length of recitation.
c. Length of study period.
d. Use of text.
e. Accuracy versus speed.
f. Value of teacher helps.
g. Request for any additional materials used.
h. Social application of the unit.

I might say that in item *a* of this group we are having our only difficulty. Many of the answers give the time spent upon the whole grade or half-grade rather than upon the individual unit. However, this will not affect the timing process, as it will be determined in another manner.

In view of the fact that the number of participants in this evaluation work is so large that we cannot thank each one of them individually, we shall appreciate it very much if you who are present will carry back to your teachers or your colleagues, our personal thanks, as well as the thanks of the Arithmetic Committee, for the splendid coöperation which has been given.

Indirectly we feel that there may have been another value. All of us know, no matter how well a course of study may be developed, if it is not used, whatever value there is in it is lost. We feel, therefore, that we have a nucleus of teachers interested, thru a close study of the thing itself, in putting its principles into actual practice.

In the few moments left to me, I shall list a few of the problems which are confronting the committee at this time.

1. How well are our pupils achieving the arithmetic that we are expecting them to achieve? I shall not discuss this, as I think Dr. Wright, the next speaker, will give you some pertinent information on the subject. It does, however, suggest that upon each of these units there is need of an "acid test" which measures the skills, the principles, the concepts, and the attitudes that are expected to be achieved. Such work is being carried forward in the development of this course of study.

2. The matter of grade placement of material is a problem which the committee has attempted to face and along which some work has been done. For example: the bulk of long division which has been partly taught in the fourth grade has, in this course, been shifted to the fifth grade. This has met with very general approval by the teachers thruout the state and by other curriculum committees outside the state. We hope to incorporate the results of these various studies into this course of study.

3. In the present course of study the arithmetic work of the seventh and eighth grades is supposed to emphasize the social side of number work. It is true at present that many teachers have not been trained along the social side of arithmetical procedure, in relation to such ac-

tivities as banking, taxes, insurance, etc. Therefore it is necessary, if this point of view be accepted thru the course of study, not only to build up objectives of the course of study and develop its methods of procedure along that line, but also to supply additional material to supplement that found in the textbooks themselves.

4. A fourth problem is how to make the arithmetic work of the seventh and eighth grades, and below, coördinate with the work of the ninth grade and the grades above. A joint committee, composed of members from the mathematics committees of both the secondary and elementary fields, is now working on this problem. They hope that the two fields may be so unified that there will be a continuous development in mathematics without the usual break which occurs between the eighth and ninth years, or between the study of arithmetic and formal algebra.

5. Another problem which concerns this committee and which the members feel the need of very keenly, is "How can our teacher-training institutions train our teachers to see effectively this point of view, and carry out the fundamental principles of such a course of study?"

6. What differentiation, if any, should be made for varying abilities?

7. Should we attempt to have each child rationalize all the processes in arithmetic, or should there be some processes which we teach the child to use, and not necessarily teach him to understand? May I not illustrate by the use of this problem? We teach children, in division of fractions, to invert the divisor and multiply. There are those of one school of philosophy who would say that we should never teach a child to do anything that he does not understand, or, to use a more modern term, we should *rationalize*.

There are those of another school who take the stand that, if teaching the child to understand a thing is more difficult than teaching him how to do the thing itself, we should teach the latter. Advocates of the latter plan believe that the thing to do is to teach the skill well, have it attained thru plenty of practice, and not to worry about the why or the wherefore of it. Let us consider again the problem of division referred to above. Take the example: $\frac{3}{8} \div \frac{3}{4}$. We teach the child to invert the divisor, or the last number, and multiply. Shall we attempt to teach the child to understand just why such a procedure will give the answer by carrying him thru the process of $\frac{3}{8}$ of $\frac{3}{4}$, so that he clearly understands the true meaning of this? Then shall we have him so clearly understand the idea of reciprocal that he can see why one should invert and multiply, or shall we assume that the rationalization of this problem is more difficult than the doing of it and therefore teach him only *how to do it?* This type of problem is found in more than one place in the teaching of arithmetic and this committee feels that it must make a decision one way or the other, and that, in the column of the course of study, "Suggested methods of procedure," it must place the plan to be used, or use the so-called modern tactful procedure, "evade the issue and omit it entirely."

8. The Arithmetic Committee has taken a stand that mastery should be achieved before speed is emphasized. At what point then

in the grade level should we bring the emphasis of speed in column addition, in the multiplication of two digit numbers, etc.?

9. There is still one more problem which I cannot help mentioning. As any of you who have studied achievement in arithmetic know, the actual achievement is far below the expected outcomes. If this proves to be true, as it seems to be, it is probable that we will be forced, in our arithmetic work, to choose between one of several possibilities of solution. We may do one or all of the following:

a. Expand the time allotments for arithmetic.
b. Increase the effectiveness of teaching methods and learning in arithmetic.
c. Reduce, even cut to the bone, the amount of arithmetic which we expect to achieve in the elementary school.

In view of the crowded program of the elementary school and with new materials for instruction coming out almost daily, it seems improbable that you as administrators would accept the solution which would increase the time allotted to arithmetic. Therefore we are virtually compelled to discard this as a solution.

In the second, i.e., the increase in the efficiency of teaching methods, there lie great possibilities. Perhaps by individual instruction, perhaps by diagnostic testing and drill, perhaps thru a closer study of the psychology of the learning of arithmetic, perhaps thru the combination of these and many other sources in which experimentation is being carried forward, there will be some adequate solution.

From the third source, that of reducing to the minimum the expected achievement in arithmetic by throwing out more and more of the less socially useful phases of arithmetic, may be found a step toward an ultimate solution of this very perplexing problem.

These and many other problems which time forbids my discussing, face this curriculum committee. Perhaps you can see from this why they consider their task one that requires years of persistent effort and the necessity of whole-hearted coöperation on the part of the school people of the state.

In this paper I have attempted a hasty review of the work which has been, and is now being, carried on by the committee in charge of the revision of the Arithmetic Course of Study under the direction of the State Department of Public Instruction. In the last analysis, this work is being carried on for the schools of the state with the hope that it will be productive of the best possible course of study that modern educational thought and procedure can give.

Perhaps the committee would be among the first to see the limitations of its own work. However, I am inclined to feel that it has done a great deal more than is generally done in developing such a course of study. It is hoped that you will make the greatest use of whatever there is in this course of study that is good, suggestive, or valuable. And when the new course of study is printed and distributed to you for use, it is hoped that you will find it an active aid in carrying forward the arithmetic work in your own school and your own community.

Measurement and the Curriculum

WENDELL W. WRIGHT, Professor of Education, Indiana University

As the speaker before me has said, measurement is an integral part of the curriculum. I wish in this short time to try to see with you the practical application of this idea. I want to discuss with you (1) some attempts that we have made in test development as related to the course of study, and (2) some results that may be of value to those interested in the development of courses of study.

Perhaps it is necessary to get in mind first that all measurement is not testing. Measurement takes place whenever an individual passes judgment on anything. "To say that a man is good, that a horse is poor value for the money, that the railroad trains in Spain are rarely on time, that the automobile is a safer means of transportation than the airplane, that asphalt pavement is better than concrete, that one teacher is better than another, that a certain school system is poorer than its neighbor, or that one person has a higher intelligence than another, means that something has been evaluated against a criterion and a conclusion has been drawn. In other words, measurement has taken place. Because of its prevalence, man could not exist long without some method of measurement, and neither could social institutions."

In any course of study we may find the objectives or expected outcomes stated. If we wish to develop measurement to determine how well these objectives or expected outcomes are attained, we must first determine which objectives can be measured by tests and which cannot be so easily and perhaps so accurately measured by this method. After we have so determined this, then, we should, by using the proper techniques of test development, set up such tests as will measure those outcomes in test form. Let me use as an example an attempt of this kind that has been made in the field of high school work in the subject of first-year Latin. In the development of the Indiana Latin Achievement Test,[1] I am indebted not only to the people whose names appear on the front of the test but also to Dr. Franzén, Miss Alexander, our Latin critic teacher, and a host of Latin teachers over the state.

From the State Course of Study in Foreign Languages for Secondary Schools in Indiana, *Bulletin* No. 100C, I find objectives of the ninth year stated. For example: "To acquire a Latin vocabulary of approximately 500 words." You will note at the first of Part I of this test there are 37 words in Latin for which the pupil is asked to write the English meaning. On the bottom of the next page, items 70 to 84, you will find 15 English words for which the Latin meaning is to be given.

[1] A copy of this test is printed at the end of this article.

These 52 words are selected by random sampling from those words used ten or more times in the state-adopted first-year Latin book.[2] Now, by simple arithmetic, if the test is properly developed it is possible to estimate in degree or amount how nearly this objective is being attained.

Another objective in the Latin course of study is stated: "To acquire a working knowledge of forms and syntax . . . causing Latin to function in understanding English grammar." Such items as 38 to 69 and 85 to 102 attempt to measure this test. The items of this, as well as all other work covered in the test, are validated by the use of the State Course of Study, the textbook, other suggested teaching material, and the opinions of Latin teachers in the field, as well as the statistical method of good and poor groups.

You will also find this objective in the State Course of Study: "To increase skill in pronunciation." At the end of Part I you will find items 153 to 157 testing this objective. On page 61 of the State Course of Study you will read as follows: "If pronunciation was not taught with the Introduction, it should be carefully taught, as it is needed in each lesson. . . . The text material on syllabication may be assigned to the pupils for reading after this subject has been presented by the teacher. Written practice in syllabication should not be discontinued until it can be done easily and correctly. Insist upon the application of the rules of accent in each word that is pronounced. Try to make pronunciation automatic with the pupils as soon as possible."

It would seem that, altho this is a small part of the expected work of the term, an attempt to test it is valid.

Part II of this test is an attempt to measure such objectives of the course as may be grouped under the objective stated in the State Course of Study: "To gain increased ability to read, comprehend, and translate Latin."

It is expected and so stated that the study of Latin should give increased ability to spell words derived from Latin. You will find an attempt to measure this objective in items 1 to 9 of Part III of the Latin test.

In the next six items and in the last nine items of the test, there is an attempt to measure such objectives as these: "To understand abbreviations of Latin words and phrases commonly used in English" and "To acquire the ability to explain the meanings of Latin phrases and quotations used in English and to memorize the most common ones."

Items 16 to 25, of Part III of the test, are an attempt to measure the objective, "To increase the ability to understand the exact meaning of English words derived directly or indirectly from Latin."

Items 26 to 75 of Part III are for the purpose of measuring the attainments of the objective, "To increase one's knowledge of Roman life and customs." This general objective is broken up into many minor objectives that I shall not quote. In the column of suggested method of procedure, one finds the suggestions that this be constantly related to present-day life and especially the contribution of this Roman civilization

[2] Magoffin, R. V., and Henry, Margaret Y. *Latin—First Year.* Silver, Burdett, and Company, 1928.

to our lives. The items included in the test are those sampled from a large number of items drawn from such references as Johnston's *Private Life of the Romans*, etc., as well as the excellent pictures found in the state-adopted text.

While we have attempted here a direct measure of many of the objectives of first-year Latin found in the State Course of Study, yet there are some objectives that we have not as yet attempted to measure except as they are measured indirectly. We have not attempted to measure directly the objective, "To develop desirable mental habits," or "To increase respect for Roman ideals of honor, patriotism, justice, etc."

Of what value is the test to the curriculum-maker? The following will illustrate. One of the group of items of this test was submitted to an excellent Latin teacher. She said that she felt that the measurement of the objective by that part of the test was all right, but she said "we pay no attention to that in teaching Latin." If the items of this test are a measure of the objectives as stated, then it would seem to me that the results of measuring such objectives ought to help this committee to determine whether the objectives are being poorly, partially, or well attained. If, then, it is found that certain objectives are not attained, it should be of value to the curriculum committee to determine why not. I am afraid we have in many courses of study (and this does not apply to the high school Latin in so far as I know), many stated objectives that lie idle and non-operative. If these objectives can be measured, it seems that it is as much the duty of curriculum-makers to determine what is being accomplished as it is to set up something to accomplish.

This test has not been developed alone for a measure of the curriculum, altho it may make an incidental contribution to those who work on curriculum. Since the test has a reliability of .97 it is hoped that the more than large number of tests that are being used will result in some help to the teacher in marking, in diagnosing difficulties, etc.

May I now turn to an attempt to see in practice an application of the use of test results in curriculum-making? In the development of the Indiana State Course of Study in Arithmetic, a statement of the expected outcomes to be attained by the end of each year was placed in one column. With the coöperation of some ten school systems which are represented by the South Central Indiana Superintendents' Research Club, we attempted last fall to measure the expected outcomes attained by pupils who had been promoted to the fifth grade. The 1,061 pupils tested were beginning their fifth grade work. They had been in school approximately a month. These pupils were tested upon the expected outcomes of the *fourth* grade. It was assumed that they had, after one month of school work, about the same standard of achievement as they had at the end of last year or the end of the fourth grade.

The test consisted of 115 items which were supposed to measure practically all of the expected outcomes of the fourth grade. No time limit was set, that is, the pupils worked on the test 30 minutes per day until it was completed. The pupils were told not to hurry. The average time for completing the test of 115 items was 79 minutes. Some pupils

completed the test in about 30 minutes; some took more than 3 hours. The important thing is that they were not hurried.

After the test was given, the number of pupils that did each item correctly was determined. From this the per cent of pupils passing each item and the average per cent of all items passed by all pupils was figured. Let us call these per cents the per cent of mastery. On the assumption that all pupils attained perfection in all items, we would have 100 per cent mastery. Had all pupils passed any one item, the per cent of mastery on that item or outcome would have been 100 per cent. I have often asked groups to guess on the per cent of efficiency attained by these 1,061 pupils in this test. Think what your guess would be. For all items by all pupils in ten school systems what is the per cent of mastery on expected outcomes?

On the 115 items that represented a test of the expected outcomes of the fourth grade when given to approximately 1,100 beginning fifth grade pupils a month after school had started, the per cent of mastery was 46.7 per cent. You must remember, of course, that the pupils had all the time necessary to complete the test, so that time was not a factor in this measurement of expected outcomes. Only 46.7 per cent mastery of expected outcomes seems disappointingly low. However, there were certain factors that tend to make this per cent of mastery as shown by the test lower than it really is. The tests were mimeographed in each of the various school systems from a copy sent to them by our Bureau of Coöperative Research. As you know, mimeographed tests often have faults or flaws that might cause pupils to work a problem incorrectly. If the same test were printed, such difficulties would not arise. There were four items on the test that had not been covered in the fourth grade. These four items were not in the old Course of Study for the fourth grade, and therefore these pupils had not had instruction in them. A leeway of 10 per cent for the deficiency in the test itself should, perhaps, be allowed. This would then give us approximately 56 or 57 per cent of mastery for the outcomes of the fourth grade by pupils who had completed the fourth grade and had begun the fifth grade work.

The per cent of pupils answering correctly each item of the 115 items of the test is given in Table I. You will notice that the first problem was tried by 1,061 pupils, the total number of cases, and was answered correctly by 426. Therefore the per cent of pupils answering this problem correctly was 40.1. This problem was: "Write the following number in figures: forty-six thousand nine." I do not care to go thru all of the problems or items of this test. However, I think it might be worth while to look at some of the problems about which there can be no question of misunderstanding or difficulty in mimeographing. The "Expected Outcomes" of the Course of Study for the fourth grade says: "Pupils shall be expected to attain the ability to add integers of at least 7 items and 5 digits, this to include problems of the broken column type." The eleventh problem in the test was this type of addition problem. Of the pupils, 51.3 per cent indicated that they had attained the ability to add and get the correct answer to such a problem.

TABLE I—RESULTS OF NEW-TYPE TEST OF FOURTH GRADE ARITHMETIC GIVEN TO BEGINNING FIFTH GRADE PUPILS (TOTAL, 1,061 CASES)

Number of Problem	Number of Pupils Answering Correctly	Per Cent of Pupils Answering Correctly	Number of Problem	Number of Pupils Answering Correctly	Per Cent of Pupils Answering Correctly
1	426	40.1	46	487	45.9
2	309	29.1	47	666	62.8
3	300	28.3	48	434	40.9
4	207	19.5	49	753	71.0
5	230	21.7	50	574	54.1
6	410	38.6	51	529	49.9
7	355	33.5	52	283	26.7
8	121	11.4	53	159	15.0
9	426	40.1	54	475	44.8
10	435	41.0	55	220	20.7
11	544	51.3	56	347	32.7
12	839	79.1	57	225	21.2
13	725	68.3	58	529	49.9
14	734	69.2	59	510	48.1
15	959	90.4	60	485	45.7
16	873	82.3	61	226	21.3
17	956	90.1	62	210	19.8
18	941	88.7	63	350	33.0
19	906	85.4	64	217	20.5
20	921	86.8	65	513	48.4
21	733	69.1	66	363	34.2
22	681	64.2	67	326	30.7
23	671	63.2	68	620	58.4
24	617	58.2	69	417	39.3
25	537	50.6	70	394	37.1
26	577	54.4	71	379	35.7
27	481	45.3	72	389	36.7
28	734	69.2	73	387	36.5
29	742	69.9	74	324	30.5
30	752	70.9	75	320	30.2
31	765	72.1	76	538	50.7
32	492	46.4	77	876	82.6
33	526	49.6	78	862	81.2
34	593	55.9	79	869	81.9
35	752	70.9	80	832	78.4
36	482	45.4	81	868	81.8
37	540	50.9	82	794	74.8
38	546	51.5	83	838	79.0
39	501	47.2	84	908	85.6
40	452	42.6	85	863	81.3
41	398	37.5	86	831	78.3
42	379	35.7	87	437	41.2
43	538	50.7	88	406	38.3
44	391	36.9	89	397	37.4
45	551	51.9	90	337	31.8

TABLE I—Continued.

Number of Problem	Number of Pupils Answering Correctly	Per Cent of Pupils Answering Correctly	Number of Problem	Number of Pupils Answering Correctly	Per Cent of Pupils Answering Correctly
91	207	19.5	106	376	35.4
92	360	33.9	107	226	21.3
93	66	6.2	108	302	28.5
94	692	65.2	109	540	50.9
95	624	58.8	110	419	39.5
96	364	34.3	111	350	33.0
97	180	17.0	112	329	31.0
98	177	16.7	113	329	31.0
99	385	36.3	114	125	11.8
100	366	34.5	115	140	13.2
101	312	29.4			
102	283	26.7			
103	484	45.6			
104	202	19.0			
105	119	11.2			

Another expected outcome in Grade 4 is "that the child should be expected to be able to subtract integers, maximum minuend of 6 integers, and subtrahend from 4 to 6 digits, and to subtract United States money to include amounts of $1,000 or more." These two outcomes are tested in problems 12, 13, and 14 and you will notice the per cent of achievement on these problems is 79, 68, and 69, respectively.

Items 24, 25, and 26 represent an attempt to measure an expected outcome which is stated as follows in the Course of Study: "Ability to multiply a three-digit number by a two-digit number with or without carrying, with zero in the multiplier and multiplicand." You will note that the per cent of achievement on these three problems is 58, 50, and 54, respectively.

Let me try to come directly to the point which I am trying to make. The relationship between measurement and curriculum-making is very direct. This May the Southern Indiana Superintendents' Research Club will carry out in the fourth, fifth, and sixth grades a testing program which covers the expected outcomes of each of the fourth, fifth, and sixth grades in arithmetic. From these results, it seems to me that the arithmetic curriculum committee can obtain much guidance in setting up the expected outcomes in the Course of Study. There is no use for us to live in a fools' paradise. If these outcomes are attainable to only 46 or 47 per cent of the pupils, or if the ability to multiply a three-digit number by a two-digit number can be attained in the fourth grade only to the degree of 50 per cent mastery, and if the measurement of the other outcomes indicates such mastery, then it seems to me that an arithmetic committee is faced with three problems: (1) it may extend the amount of time to be given to arithmetic either by ex-

tending arithmetic upward in the grades or by increasing the amount of time given to it in each of the grades, (2) it may suggest ways of increasing the efficiency of teaching methods and pupil learning, or (3) it may do what may seem more advisable, that is, it may prune the arithmetic curriculum until it includes only those things of most vital social worth. The committee might find it possible to reduce the division of fractions to a few of the most socially valuable types of division, such as, for example $1/2 \div 2/3$; and it might eliminate from the arithmetic curriculum the division of fractions that include such fractions as $4/5$ of $5/8$, $3/4$ of $5/6$, etc.

It further seems to me that the results of such testing might tell us rather directly the expected outcomes that may be attained by the brighter pupils, those that may be attained by the average pupils, and those that may be attained by the slower pupils.

I began this speech attempting to bring before you the point that measurement is a vital part of curriculum-making. I hope I have gained my point and have had you see that measurement is not something isolated from the curriculum, but something that functions very vitally in relation to it.

Experimental Form A 1930 Edition

INDIANA LATIN ACHIEVEMENT TEST

For Ninth Grade

Based on the Objectives of the State Course of Study

Prepared by the

BUREAU OF COÖPERATIVE RESEARCH, SCHOOL OF EDUCATION,
INDIANA UNIVERSITY

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Henry Lester Smith, Director

Name_____ County_____

School_____ Teacher_____ Grade_____

Boy or Girl_____ Age_____ Years _____ Mos. Date_____

Mailing Address_____

Part	Score
I	
II	
III	
TOTAL	

Each of you should have a sharpened pencil. If your pencil point should break during this test, hold up your hand and your teacher will give you another pencil.

When you are told to start working on the test begin and continue working until you have completed Part I, unless the teacher tells you to stop before you have finished it. If the teacher tells you to stop before you have finished Part I, stop at once. Do not begin Part II or Part III until you are told to do so.

PART I Form A

In the blank after each of the following Latin words you are to write the English meaning of that word.

1.	via	_____	20.	saepe	_____
2.	hostis	_____	21.	praemium	_____
3.	rēx	_____	22.	putō	_____
4.	locus	_____	23.	porta	_____
5.	mōns	_____	24.	sī	_____
6.	nāvis	_____	25.	is	_____
7.	cognōscō	_____	26.	petō	_____
8.	semper	_____	27.	rīpa	_____
9.	auxilium	_____	28.	gravis	_____
10.	amīcus	_____	29.	lēx	_____
11.	dō	_____	30.	factum	_____
12.	veniō	_____	31.	paucī	_____
13.	dūcō	_____	32.	potēns	_____
14.	dīcō	_____	33.	nēmō	_____
15.	quaerō	_____	34.	tantus	_____
16.	pōns	_____	35.	facile	_____
17.	cīvis	_____	36.	senātus	_____
18.	spatium	_____	37.	trādō	_____
19.	prīmum	_____			

Below are some sentences followed by incomplete statements about their form. You are to write in the blanks in each of the statements the word or words which will make them correct. The blanks in the example are filled for you.

EXAMPLE: **The hunter was killing the rabbit.**

38a-39a. The subject in the above sentence is *hunter*, and if it were expressed in Latin, the *nominative* case would be used.

40a-41a. The verb in this sentence is *was killing*, and if it were expressed in Latin, the *imperfect* tense would be used.

42a-43a. The direct object is *rabbit*, and if it were expressed in Latin, the *accusative* case would be used.

The north wind has driven the ship into port.

38-39. The subject in the above sentence is _____, and if it were expressed in Latin, the _____ case would be used.

40-41. The direct object in the sentence is _____, and if it were expressed in Latin, the _____ case would be used.

42-43. The verb is _____, and if it were expressed in Latin, the _____ tense would be used.

44-45. The attributive adjective is _____, and if it were expressed in Latin, the _____ case would be used.

46-47. The prepositional phrase used adverbially is _____, and if it were expressed in Latin, the _____ case would be used.

The book is on the table.

48-50. The prepositional phrase which is used adverbially in the above sentence is _____, and if it were expressed in Latin, the _____ case _____ a preposition would be used.

His donkey is very old.

51-52. The pronoun in the above sentence is_____, and if it were expressed in Latin, the_____case would be used.

53. The adverb in the sentence is_____.

54-55. The predicate adjective is_____, and if it and the adverb were expressed together in Latin, the_____degree would be used.

Their request refused, they departed.

56-57. The dependent part of the above sentence is_____, and if it were expressed in Latin, the_____would be used.

You are to give the gender of the Latin words in the list below. On the blank opposite each word place the letter "m" if the word is masculine gender, "f" if it is feminine, or "n" if it is neuter. The first word "agrī" is masculine gender so "m" is placed on the blank. Now go ahead and mark the rest of the words correctly.

58a. agrī	*m*	64. bellōrum	
58. virō		65. terrīs	
59. fīlia		66. ōrātōre	
60. oppidum		67. mare	
61. equī		68. marī	
62. ducem		69. lēgibus	
63. animālium			

Write the Latin meaning in the blank after each of the following English words.

70. arena		78. sea	
71. river		79. conquer	
72. but		80. god	
73. story		81. building	
74. high		82. master	
75. people		83. new	
76. house		84. nation	
77. noble			

Below you will find some verb forms. Each verb is followed by four translations only one of which is correct. Underline the correct form and write the number found in parentheses preceding it in the blank at the right. If you are not sure which is correct, go on to the next. Do not underline more than one translation. The first one is done correctly for you.

85a. **cēpit**—(1) he took, (2) he takes, (3) he was taken, (4) he had taken. *1*

Remember you are to do TWO things.

85. **dolēre**—(1) to grieve, (2) to have grieved, (3) grieving, (4) having grieved. ____

86. **augēre**—(1) having increased, (2) increasing, (3) to have increased, (4) to increase. ____

87. **movēbit**—(1) he moved, (2) he will move, (3) he has moved, (4) he ought to move. ____

88. **occīdēbātur**—(1) he was killed, (2) he will be killed, (3) he killed, (4) let him kill. ____

89. **monēbitur**—(1) he will warn, (2) he was warned, (3) he will be warned, (4) he had warned. ____

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90. **exīstimāvimus**—(1) we shall think, (2) we have thought, (3) let us think, (4) we think. ____
91. **fugiēns**—(1) fleeing, (2) having fled, (3) to flee, (4) to be about to flee. ____
92. **eris**—(1) you are, (2) you were, (3) you have been, (4) you will be. ____
93. **portāta est**—(1) she has been carried, (2) she will be carried, (3) she carries, (4) she had been carried. ____
94. **audītī sunt**—(1) they have heard, (2) they are heard, (3) they have been heard, (4) they will have been heard. ____
95. **dēlēcta erat**—(1) she has been chosen, (2) she had been chosen, (3) she is about to choose, (4) she will have been chosen. ____
96. **veniēbat**—(1) he was coming, (2) he has come, (3) he may come, (4) he comes. ____
97. **dēfenderās**—(1) you were defended, (2) you defended, (3) you had defended, (4) you have defended. ____
98. **accūsātus**—(1) accusing, (2) being accused, (3) to have accused, (4) having been accused. ____
99. **collocātūrus est**—(1) he is about to collect, (2) he ought to collect, (3) he had collected, (4) let him collect. ____
100. **dūcis**—(1) you led, (2) you may lead, (3) you will lead, (4) you lead. ____
101. **erās**—(1) you are, (2) you were, (3) you have been, (4) you will be. ____
102. **faciētur**—(1) it has been done, (2) it will be done, (3) it is done, (4) it does. ____
103. **mūniētur**—(1) it was fortified, (2) it is fortified, (3) it had been fortified, (4) it will be fortified. ____
104. **contenderint**—(1) they had fought, (2) they fight, (3) they will have fought, (4) they will be fighting. ____
105. **dabō**—(1) I gave, (2) I was giving, (3) I shall give, (4) I give. ____
106. **cōnfēcit**—(1) he was finishing, (2) he finishes, (3) he shall finish, (4) he has finished. ____
107. **sustinuisse**—(1) to withstand, (2) to have withstood, (3) having withstood, (4) to be withstood. ____
108. **respondē**—(1) to answer, (2) to be answered, (3) answer, (4) having answered. ____
109. **rēxerimus**—(1) we shall rule, (2) we were ruled, (3) we have ruled, (4) we shall have ruled. ____

In the list of verbs given below, all the forms of the principal parts are given except one. A blank space is left for the missing form, and you are to fill in the space with the proper form. The first one is filled in for you.

110a. sum, esse, *fuī*, futūrus.
110. amō, ____, amāvī, amātus.
111. retineō, ____, retinuī, retentus.
112. laudō, ____, laudāvī, laudātus.
113. moneō, monēre, ____, monitus.
114. agō, ____, ēgī, āctus.
115. respondeō, respondēre, respondī, ____.
116. capiō, capere, cēpī, ____.
117. veniō, ____, vēnī, ventūrus.
118. stō, stāre, ____, stātūrus.
119. intellegō, intellegere, ____, intellēctus.
120. cupiō, cupere, ____, cupītus.
121. fugiō, fugere, fūgī, ____.
122. augeō, augēre, ____, auctus.
123. cōnsīdō, cōnsīdere, cōnsēdī, ____.
124. repellō, repellere, ____, repulsus.

Compare the adjectives and adverbs given below. Write the comparative form of the word in the column headed "Comparative" and the superlative form in the column headed "Superlative." The first one is marked for you.

	Positive	Comparative	Superlative
125a-126a.	pulchrē	*pulchrius*	*pulcherrimē*
125-126.	lātus		
127-128.	lātē		
129-130.	diū		
131-132.	prope		
133-134.	parvus		
135-136.	bene		
137-138.	līber		
139-140.	malus		
141-142.	magnopere		

You are to translate the following groups of words. Write the correct Latin verb forms in the blanks to the right. The first one is answered for you.

143a.	They carry	*portant*
143.	To love	
144.	She was standing	
145.	We have attacked	
146.	To have fortified	
147.	To have been	
148.	They will have been warned	
149.	I shall have been ordered	
150.	To be about to give	
151.	It is held	
152.	It will be sent	

In the blanks beside each of the following words you are to

(1) Divide the following words into syllables.
(2) Put a straight line (¯) over all of the long vowels.
(3) Place the accent mark (′) where it belongs.

The first word is divided and marked as it should be.

153a.	mercator	*mer cā′tor*	155.	domina	
153.	templo		156.	consilio	
154.	videbantur		157.	meridianam	

Stop: Close your booklet until further instructed.

Part I—No. Right_____

PART II Form A

Below you will find a number of Latin sentences. Under each are given four translations. Put a cross (*X*) before the correct translation of the Latin sentence. The first one is marked correctly for you.

1a. Puella rosam videt.
- a. The girl is good.
- b. It is the girl's rose.
- *X*c. The girl sees a rose.
- d. The boy found a rose.

1. In pictūrā sunt portae multae.
   - a. The picture has many colors.
   - b. There are many gates in the picture.
   - c. Many pictures have gates in them.
   - d. He carries many pictures.
2. Galba Clārae aquam dat.
   - a. Clara saw Galba the sailor.
   - b. Clara gave water to Galba.
   - c. Galba gives the water to Clara.
   - d. Clara sees Galba the king.
3. Regulō duce, cum Gallīs contendērunt.
   - a. The king dead, the Gauls fled.
   - b. Regulus killed, they conquered the Gauls.
   - c. The leader wounded, the Gauls won.
   - d. With Regulus as leader, they fought with the Gauls.
4. Crūdēlissimē eum hostēs necāvērunt.
   - a. Very cruel enemies saw him.
   - b. The enemy very cruelly killed him.
   - c. The work was crudely done.
   - d. He cruelly slaughtered the enemy.
5. Servus dicit sē nōn esse domī.
   - a. The slave did not say anything.
   - b. The slave never came home.
   - c. The slave said his master was at home.
   - d. The slave says that he is not at home.
6. In cisternā est aqua.
   - a. Is water in the cistern?
   - b. The cistern is deep.
   - c. There is water in the cistern.
   - d. There is a cistern and water.
7. Rōmānī deōs multōs colēbant.
   - a. The Romans had many gods.
   - b. Many gods ruled the Romans.
   - c. Many Romans worshipped gods.
   - d. The Romans worshipped many gods.
8. Quō nōmine ille senex appellātur?
   - a. Who called that old man by name?
   - b. Whose name did the old man call?
   - c. By what name is that old man called?
   - d. By whose authority did the old man leave?

Below you will find a number of English sentences. Under each are given four translations in Latin. Place a cross (*X*) before the correct translation of the English sentence. The first one is marked correctly for you.

9a. The street is not long.
- a. Aqua est alba.
- *X*b. Via longa nōn est.
- c. Via longa est.
- d. Via alta nōn est.

9. Our native country is beautiful.
   - a. Nostra patria parva est.
   - b. Nostra patria pulchra est.
   - c. Ītalia pulchra patria erat.
   - d. Nostra patria pulchra erat.

10. This man is a Roman; that man is a barbarian.
   - a. Vir Rōmānus est, vir Gallus est.
   - b. Hic vir est Rōmānus, ille puer est barbarus.
   - c. Hic vir Rōmānus est, ille vir barbarus est.
   - d. Ille homō est Germānus, hic vir est Gallus.

11. Marcus gives the water to the girls.
   - a. Mārcus puellīs aquam dat.
   - b. Puella Mārcō aquam dat.
   - c. Mārcus aquam puellae dābat.
   - d. Mārcō puellae aquam dant.

12. The slaves will carry the statue.
   - a. Statua ab servīs portābitur.
   - b. Servī statuam portābunt.
   - c. Servī scūtum portant.
   - d. Servī statuam portant.

13. The envoys salute the farmer.
   - a. Lēgātī agricolam spectant.
   - b. Agricola lēgātōs salūtat.
   - c. Agricola lēgātōs laudat.
   - d. Lēgātī agricolam salūtant.

14. Cornelia is a pretty girl.
   - a. Cornēlia puella pigra erat.
   - b. Cornēlia puella bona est.
   - c. Cornēlia puella pulchra est.
   - d. Cornēlia puella pulchra erat.

15. The Romans can conquer these men.
   - a. Hostēs ā Rōmānīs necātī sunt.
   - b. Rōmānī hominēs hōs vincere possunt.
   - c. Hominēs Rōmānōs vincere possunt.
   - d. Rōmānī virōs illōs vincunt.

16. He said that this man was too bold.
   - a. Dīcit virum pigrum esse.
   - b. Dīxit virum hunc ācriōrem esse.
   - c. Exīstimāvit virōs ācriōrēs esse.
   - d. Hic homō ācrior erat.

17. The journey from the sea to the city is not long.
    a. Urbs ā marī nōn longa est.
    b. Iter ad mare ab urbe longum nōn est.
    c. Iter ā marī ad urbem longum nōn est.
    d. Via ad urbem ā marī angusta erat.
18. The women had no food.
    a. Nullus cibus fēminae erat.
    b. Fēmina cibum nōn habet.
    c. Fēminae cibum nullum habuērunt.
    d. Fēminae cibum nullum habent.

Read the following paragraph very carefully, and then answer the questions below.

Xerxēs, fīlius Dārī, post mortem patris, rēgnum Persārum obtinuit. Is rēx, proelium ad Marathōna memoriā tenēns, Graecōs vincere cōnstituit. Quattuor annōs, igitur, cōpiās magnās hominum, equōrum, nāvium comparāvit. Tum duōbus pontibus cōpiās ex Asiā in Eurōpam trādūxit.

The following questions are based on the paragraph you have just read. Write the answer to each *in English* in the blank to the right of the question.

19. Eratne Xerxēs fīlius Dārī? _____
20. Quōs vincere cōnstituit? _____
21. Comparāvitne hominēs? _____
22. Comparāvitne equōs? _____
23. Comparāvitne rosās? _____
24. Necātusne Xerxēs est? _____
25. In quem locum Xerxēs cōpiās trādūxit? _____
26. Ubi Xerxēs rēx erat? _____
27. Cūr Xerxēs Graecōs vincere cupīvit? _____
28. Trādūxitne cōpiās statim? _____

Read the following paragraph carefully. Then answer the questions which are based on this paragraph. Write your answer to each question *in English* in the blank beside the question.

Antīquīs temporibus crēdēbātur deōs saepe in terrīs breve spatium temporis manēre atque ab hominibus vidērī. Haec fābula dē Iove et Mercuriō nārrātur. Iuppiter et Mercurius ōlim errantēs multā nocte in vīcum pervēnerant et ad multās portās hospitium rogāverant. Omnēs incolae deōs reppulērunt.

29. Estne Iuppiter, Iovis? _____
30. Quī erant deī? _____
31. Rogāvēruntne deī hospitium? _____
32. Eratne Iuppiter in equō? _____
33. Vidēbantne umquam hominēs deōs? _____
34. Eratne in vīcō una porta? _____
35. Invītāvēruntne incolae Mercurium? _____
36. Pervēnēruntne deī prīmā lūce? _____
37. Mansēruntne deī longum spatium temporis? _____
38. Nārrāvēruntne portae hanc fābulam? _____

Stop: Close your booklet until further instructed.

Part II—No. Right_____

PART III Form A

Below is a list of words each of which is spelled in three different ways. You are to underline the word in each group which is spelled correctly. The first one is underlined for you.

1a.	expectent	expextant	expectant
1.	villege	village	villige
2.	executive	executave	exicutive
3.	agent	agant	agunt
4.	filliel	fillial	filial
5.	fabulious	fabulous	fabullus
6.	admoition	admonition	admonuition
7.	labratory	labretory	laboratory
8.	expediunt	expedient	expediant
9.	villain	villian	villein

Below is a list of abbreviations which are derived from Latin words. You are to give the English meaning of each in the blank at the right. The first one is given for you.

10a.	lb.	*pound*			
10.	P. S.	_____	13.	M. D.	_____
11.	vs.	_____	14.	cf.	_____
12.	e. g.	_____	15.	A. B.	_____

The underlined words in the following sentences are derived from Latin. Place a cross (*X*) before the one sentence that has the same meaning as the one containing the underlined word. The first one is marked for you.

16a. Harold's vision was poor.

a. Harold had acute parenchymatous tonsilitis.
b. Harold had dementia praecox.
c. Harold could not hear well.
X d. Harold had poor eyesight.

16. A mountain is said to have altitude.

a. A mountain is said to have length.
b. A mountain is said to have massiveness.
c. A mountain is said to have height.
d. A mountain is said to have enchantment.

17. The sailors wished to circumnavigate the earth.

a. The sailors wanted to discover a new part of the earth.
b. The sailors wished to sail around the earth.
c. The sailors wished to set a new speed record for the world.
d. The sailors wished to explore new seas.

18. They presented the data on the subject.

a. They presented the pictures on the subject.
b. They presented the questions on the subject.
c. They presented the facts on the subject.
d. They presented the speeches on the subject.

19. Rome used to deport undesirable citizens.

a. Rome used to banish undesirable citizens.
b. Rome used to behead undesirable citizens.
c. Rome used to confiscate property of undesirable citizens.
d. Rome used to imprison undesirable citizens.

20. The authors decided to collaborate on the new book.
    a. The authors decided to censor the new book.
    b. The authors decided to publish the new book anonymously.
    c. The authors decided to autograph the new book.
    d. The authors decided to work together on the new book.
21. The audacity of the child was unusual.
    a. The ingenuity of the child was unusual.
    b. The precocity of the child was unusual.
    c. The boldness of the child was unusual.
    d. The timidity of the child was unusual.
22. Laws are made for the prohibition of certain evils.
    a. Laws are made for the promotion of certain evils.
    b. Laws are made to forbid certain evils.
    c. Laws are made to protect people from certain evils.
    d. Laws are made to encourage certain evils.
23. This pronoun has an antecedent.
    a. This pronoun has a definite word to which it refers.
    b. This pronoun has a modifier.
    c. This pronoun takes an attributive adjective.
    d. This pronoun is used with a preposition.
24. The man had remarkable tenacity of purpose.
    a. The man had a wonderful memory.
    b. The man had a tendency to stray from his purpose.
    c. The man had a remarkable instinct of caution.
    d. The man had remarkable ability to hold to his purpose.
25. The missile failed to explode.
    a. The dynamite did not explode.
    b. The shot from the cannon failed to explode.
    c. The charge of gas in the engine failed to explode.
    d. The boiler did not explode.

Below are a number of statements some of which are correct and some incorrect. You are to place a plus sign (+) in the blank before each correct statement and a circle (O) in the blank before each incorrect statement.

____26. The Circus Maximus was famous for its chariot races.
____27. The Roman physicians were as skilled as our American doctors.
____28. Cicero and Demosthenes perhaps rank as two of the world's most famous orators.
____29. The Romans cared little for Greek art, pottery, and literature.
____30. The Romans invented much new labor saving machinery in order to give the slaves plenty of work to do.
____31. Roman girls usually married before they were eighteen years of age.
____32. The toga was the working garment of the plebs.
____33. The Forum was often used as a meeting place for political discussions.
____34. All Roman money was made of gold.
____35. The Apostle Paul once travelled over the Appian Way.
____36. The Roman army had no cavalry.
____37. The Oracle at Delphi was as reliable to foretell future events as are modern fortune tellers.

___38. Leonidas and Horatius are remembered for their bravery and patriotism.
___39. Many pictures of Greek and Roman life, as well as those of early American life, are painted on vases and dishes.
___40. Possessors of large Roman fortunes usually were very willing to pay their fair share of the taxes and seldom tried to shift the chief tax burden to the poorer people.
___41. Mercury was the wing-footed messenger of the gods and was also a god of commerce.
___42. Atalanta captured the "Golden Fleece."
___43. The Appian Way had so many tombs and monuments along it that it soon was used exclusively for funeral processions.
___44. Rome had no florists.
___45. The United States, unlike Rome, can safely ignore increases in law breaking.
___46. The beginning of Rome's downfall can be traced from the beginning of the disintegration of the home life of the people.
___47. The Romans set standards for the world both in civil and in international law.
___48. Roman emperors often owned and lived in summer homes in the mountains, as do some American families.
___49. Rome had no antique dealers.
___50. All Roman chariots were drawn by four horses.
___51. A Roman temple was equipped with a pulpit and with seats for the congregation.
___52. Almost every Roman boy became a skilled user of boxing gloves.
___53. Roman wars resulted in war profiteering just as modern wars have.
___54. Rome is a seaport.
___55. Most Romans rose rather early in the morning.
___56. The chief sources of water supply for Rome were wells.
___57. Cincinnati, Ohio, was founded by the descendants of Cincinnatus, the Roman farmer.
___58. Trajan's column has many pictures of the Dacian Wars.
___59. Jupiter was supposed to have two faces so he could watch and guard over both gates at the same time.
___60. The bulla was worn by little girls as a protection against the "evil eye."
___61. Living conditions were usually made so much better under Roman rule that conquered nations were often glad to remain under Roman control.
___62. Nero said, "I found Rome a city of brick and left it a city of marble."
___63. Much of the marble which was used for Roman buildings was quarried in Greece.
___64. Many of the engineering principles used in planning Roman roads were used in planning the trunk lines of American railroads.
___65. Roman politicians never hired gangsters to prevent citizens from voting.
___66. Roman girls and boys kept small savings banks just as do many present day American children.

___67. Oil has been the chief machine lubricant from the time of Caesar to the present date.
___68. The Forum was located on the top of Capitoline Hill.
___69. Public Roman "baths" were used exclusively for bathing.
___70. A Roman who drank wine before weakening it by the addition of much water was frowned upon by polite society.
___71. Ruins of many Roman buildings exist in Africa today.
___72. The Tiber River is as large as the Ohio River.
___73. The Arch of Titus has three openings through it.
___74. Excavating Pompeii has been very difficult because the city was covered more by molten lava than by ashes.
___75. Candles rather than lamps were used by the poor people of Rome.

Below are some groups of words in English. You are to write in the blank following each the Latin quotation for that group of words. The first one is given for you.

76a. A sound mind in a sound body.
Mēns sāna in corpore sānō.

76. Deeds not words.

77. The truth shall make you free.

78. The guide of life is common sense.

79. Do it now.

Write in the blanks the English meaning of the Latin quotations given below. The first one is done correctly for you.

80a. Respice, adspice, prōspice.
Look back, look at, look forward.

80. Sīc semper tyrannīs.

81. Sī vīs pācem, parā bellum.

82. In hōc signō vincēs.

83. Repetītiō est māter studiōrum.

84. Audācēs fortūna iuvat.

Stop: Close your booklet until further instructed.

Part III—No. Right_____

Laboratory Studies of Reading
(Abstract)

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IT is particularly appropriate that a discussion of laboratory investigations relating to a school subject should be given before a group of supervisors, since it is quite generally recognized among laboratory scientists that the supervisor is the principal person who must interpret the results of laboratory experiments in terms which can be applied in the actual practices of classroom teachers. The majority of teachers do not have the time or the technical preparation necessary for reading and interpreting scientific reports. The laboratory scientist seldom knows the intimate details of classroom instruction sufficiently to suggest all the possible applications of the findings of his experiments. However, the supervisors are both acquainted with the details of classroom instruction and are also fitted by their training to read and interpret the reports of studies made in the laboratory. Thru the supervisors the laboratory technician and the classroom teacher are able to relate their work.

This discussion will deal with only two problems relating to reading. The first of these is a problem of diagnosing, in a somewhat specific manner, the perceptual difficulties which a child experiences in mastering the mechanics of reading. The second has to do with the development of habits of rhythmic grouping of words into proper units of thought.

It is assumed that this audience of supervisors is already familiar with the general technique of photographing eye-movements in reading. In the eye-movement studies which have already been reported in great detail in educational literature, three basic habits of reading are revealed. Each of these three habits may be made the subject of specific diagnostic and remedial procedure. These habits are: first, the development of a wide recognition span measured by the average number of eye-fixations per line in reading; second, the development of quick habits of recognition as measured by the average duration of fixation pauses; and third, the habit of regular rhythmic procedure across the lines of print as measured inversely by the number of regressive movements per line.

While the initial experimentation with these basic habits of reading required the use of elaborate apparatus and very precise measurements, now that the general characteristics of eye-movements have been described the teacher may be able to make some practical use of the findings by the rough approximation to precision which may be made in count-

ing eye-movements by direct observation. By referring to previous studies of eye-movements one may find data showing the typical number of fixations per line in each of the grades of the elementary and high schools for a standard selection of reading material. By having pupils read this same selection, counting the fixations of the eyes for a certain number of lines and then computing the average, a figure may be secured which will be a sufficiently close approximation to a correct count to serve for diagnostic purposes. If a pupil is found who is decidedly below normal for his grade in number of fixations per line, the teacher may assume that this is a case which needs specific training in improving the width of the recognition span. Or if, on a count of eye-movements where one keeps a record of the total number of fixations for a given number of seconds and then divides to find the average duration per fixation, a pupil shows a long average fixation time, one may have the basis for further remedial treatment such as flash-card exercises for quickening the perceptual process. Still further, if one finds an abnormally large number of regressive movements per line, one may improve the regularity of eye-movement habit by supplying easy reading material, selected at a level probably two grades below that in which the pupil is working, and then insisting upon rapid reading of this material.

To summarize the statements made in the preceding discussion one may say that the evidence now available from the laboratory studies of reading may be used for specific analysis and remedial treatment of defects in the perceptual processes. Since these perceptual habits are basic to all reading it is highly important that the pupil be carried to the level of mastery of them by the time he reaches the fifth or sixth grades in the elementary school. Consequently, the remedial devices mentioned would have their chief application in grades 3, 4, and 5. These procedures are recommended only for those pupils who are notably below normal in reading, but, if used with the lower 10 or 15 per cent of the pupils, the exercises are well worth the time required of the teacher in administering them.

The second problem to be discussed in this paper is that of developing habits of grouping words into proper units of thought rather than simply pronouncing them one by one in monotonous fashion. In order to secure evidence as to the habits of pupils in this respect, a group of children was asked to read a paragraph into a dictaphone. Afterwards the dictaphone record was transcribed onto a kymograph record by tapping a key each time a word was pronounced. By this method the time interval between each word could be computed in terms of fifths of a second and charts could be made showing these intervals.

By comparing the reading of children who were mature in their habits with those who were immature it was apparent that the mature children grouped their words into proper units of thought, whereas those who were not as mature in their habits tended to read with a good deal of monotony. By extending the experiment with this kind of technique to cover various methods of teaching it was found that the pronunciation of words in rhythmic units was a product of the kind of

method used and that, where one used a method which emphasized the pronunciation of words as the objective in reading, the result was ordinarily nothing more than a monotonous pronunciation of word after word. On the other hand, where the primary objective of the reading method was the development of recognition of units of thought, the rhythmic character of the pronunciation was much more marked. By synchronizing the record from the dictaphone with the record from the eye-movement camera one is able to determine what a pupil does with his eyes while making long pauses in pronouncing words when reading orally. The evidence from these synchronized records is perfectly conclusive that during the long pauses the pupil is not simply doing nothing, but is extremely active in examining the material with his eyes, evidently trying to overcome some difficulty which must be mastered before he can pronounce the next word. Quite frequently these difficulties were found to be difficulties of vocabulary, altho in some cases they seemed to be general periods of confusion where the reader was not getting correct meanings from his sentences.

It is difficult to illustrate in a brief abstract the possibilities of using results of laboratory studies in diagnoses. In the original address stereopticon slides were used to illustrate this possibility.

Knowledge of Arithmetic Possessed by Young Children

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Background of the Investigation

THIS investigation, to determine the knowledge of arithmetic possessed by children at the time of beginning formal instruction in that subject, was undertaken partly because of a consciousness of the conflicts in the theory concerning the proper time for introducing the formal teaching of the subject, and partly because of the results of recent experimental work in arithmetic undertaken in the primary grades. Those making a study of theories concerning the best time for the beginning of the formal teaching of arithmetic will encounter a variety of statements, some advocating the beginning of such teaching in Grade I and others advocating its postponement until the beginning of Grade IV. Some argue that the child has a need for arithmetic in his out-of-school life and that the school should provide training for meeting these needs; some take the position that the child should be taught the fundamental processes in the primary grades but that no attempt should be made to teach so-called reasoning problems; others contend that a child's range of experience is so limited that if the teaching of arithmetic is postponed until the beginning of Grade IV his ability to grasp the significance of the concepts and relationships will have developed to such an extent that the subject can be mastered with greater ease and permanency.

A great variety in practices has grown out of these differences in theory. Even tho there have been no very recent studies, it seems safe to venture that the majority of schools begin the formal study of arithmetic at the beginning of Grade II. However, all are familiar with schools which begin such instruction at the beginning of Grade I or even to some extent in the kindergarten, and with those which postpone such instruction until the beginning of Grade III. All are familiar with Taylor's investigation in New York City from which he concluded that it is wiser to omit the study of arithmetic in Grade I and to devote the time usually given to the teaching of arithmetic to the study of reading. Regardless of the time at which formal instruction is introduced, there is great variation in the content of the subject-matter of beginning textbooks in arithmetic. Some books limit the subject-matter very largely to counting and to drill exercises in the four fundamental processes; others include exercises involving the use of fractions, United

States money, and measurements of all types. The former type of book seems to be based upon the theory that exercises in fractions, United States money, and measurements should be postponed until the later grades, because the child in the primary grades does not have the ability to master such abstract processes; the latter type of book emphasizes the fact that these processes constitute a fundamental part of the child's every-day experience and can be as easily mastered as the phases of the fundamental processes.

These conflicts concerning the best time for beginning formal instruction in arithmetic and the type of subject-matter which should be included in beginning textbooks did a great deal to suggest the investigation to be described later, but the real force prompting it was experimental evidence which seemed to indicate that children in the primary grades have considerably more knowledge of arithmetic than they are supposed to have. This evidence was gained from some investigations which the writer was directing on the subject of transfer of training in the teaching of the fundamental processes. These investigations were undertaken in Grades I and II, or the time indicated in the course of study for the beginning of formal instruction in addition. The experimental procedure was meticulously planned, but when the children were given a pre-test from which it was proposed to measure the transfer effects of specified teaching, they answered correctly almost all of the exercises, even tho they had not been taught addition and were not supposed to know how to add. The percentage of correct responses was surprisingly large and was so great that investigations in three different schools had to be remodeled. This unsuccessful venture in the preliminary stages of an investigation made clear to the writer the necessity of making a detailed inventory of the knowledge of arithmetic possessed by children at the beginning of formal instruction.

The Inventory Test

DESCRIPTION OF THE TEST. The inventory test used in this investigation consists of 204 different arithmetic situations to which the child is asked to make response. It consists of the following types of exercises:

TABLE I—OUTLINE OF CONTENT OF INVENTORY TEST

Type of Exercise	Number of Exercises
PART I—	
Rote counting without objects	5
Counting by enumeration	2
Recognition of number as a group—	
Domino arrangement	4
Dot arrangement	4
Line arrangement	4
Star arrangement	3
Reading of numbers—	
Numbers on a calendar	6
Numbers in a row	6
Numbers in columns	12
Pages in a book	6
PART II—	
Size of numbers—	
Numbers with concrete objects	8
Numbers in the abstract	14
Telling time—	
Reading time from face of clock	4
Placing hand to designate time	4
Fractions—	
Recognition of fractions	3
Size of fractions	8
United States money—	
Recognition of coins	5
Value of coins	12
Linear measure	4
Liquid measure	4
Solving simple verbal problems	18
PART III—	
Exercises in addition	39
Exercises in subtraction	30
Total	204

In selecting the items for the test, the writer was guided by the following considerations: (1) to include only those types of situations which exist in the social environment of the child; (2) to include a large variety of types of arithmetic situations in order to make the inventory as complete as possible and to determine the extent of the familiarity of children with the various aspects of the number concept as outlined by Thorndike; (3) to build a test that would be simple enough for those children who begin arithmetic in Grade I and at the same time difficult enough for those who do not begin the subject until Grade III. The test was constructed after considerable study of the literature on the teaching of primary arithmetic and after examination of the objectives enumerated for Grades I, II, and III, in such sources as the Third and Fourth *Yearbooks* of the Department of Superintendence of the National Education Association, Guiler's *Objectives and Ac-*

tivities in Arithmetic, Morton's *Teaching Arithmetic in the Primary Grades*, and various courses of study in arithmetic.[1]

A preliminary edition of the test was submitted for criticism to various elementary school principals and teachers in the public schools of Ann Arbor. After modification, a number of teachers gave the proposed tests to several primary children and on the basis of that experience suggested further modifications in the directions, language usage, and the exercises themselves. Among such modifications, it was suggested that provision for considerable more space be left after each series of exercises so that there would be ample room for recording a description of the child's behavior while responding to the exercises.

The inventory test itself consists of two different booklets, one booklet for the teacher giving the test which may be referred to as the *Teacher's Material*, and the other booklet for the pupil, referred to as the *Pupil's Materials*. The former includes the general instructions concerning the investigation, the method of interviewing the child, and the detailed directions for giving each set of exercises; the latter, test-situations to be presented to the child when it became necessary that he have the situations before him in making responses.

THE ADMINISTRATION OF THE TEST. This test is merely an interview blank and is in no sense a standardized test. The test is divided into three parts: Exercises I to IV, inclusive, constituting Part I; Exercises V to IX, inclusive, constituting Part II; Exercises X and XI, constituting Part III. It is administered individually and has no definite time limits. Those administering the tests indicated that the total time required for administration approximated sixty minutes, depending upon the rate at which the pupil worked and the amount of time which the examiner used for writing comments on the pupil's behavior in making responses. The child was given an opportunity to respond to each item, unless it was clear to the one giving the test, from the responses to other items in the exercise, that it was useless for the child to make an attempt. Those administering the test made a record of the responses made to each item in a given exercise.

SELECTION OF THE PUPILS TO BE INTERVIEWED. General instructions accompanying the interview blanks asked for the coöperation of teachers in selected school systems thruout the United States in interviewing six pupils in the grade just previous to the one in which formal instruction in arithmetic is begun. According to the letter of transmittal sent to the superintendent and according to the instructions given in the *Teacher's Material*, the time of beginning formal instruction was designated to mean the time at which a definite period in the teaching

[1] Third *Yearbook* of Department of Superintendence (Washington, D.C., National Education Association, 1925) Part III, pp. 35-108.

Fourth *Yearbook* of Department of Superintendence (Washington, D.C., National Education Association, 1926) Part III, Chap. VII, pp. 173-221.

W. S. Guiler, *Objectives and Activities in Arithmetic* (Chicago, Rand McNally and Co., 1926).

Robert Lee Morton, *Teaching Arithmetic in the Primary Grades* (Silver, Burdett and Co., 1927).

schedule is set aside for presenting facts and concepts according to a definitely systematized plan. It was made clear in these communications that formal instruction does not refer to the incidental teaching which was given in response to the number-needs of situations arising in connection with the ordinary routine of the school day. It was furthermore made clear that formal instruction means systematized instruction and that it does not necessitate the use of a textbook. The time for the beginning of this formal instruction is usually designated in the course of study for a given city or in some official document issued by the superintendent of schools.

Thus, altho there was some variation in the grades from which the pupils were selected, the method of selection within a grade was constant. The instructions directed the teacher to select only those pupils who had received all their training within the given city and who had made normal progress. The teacher was then directed to interview the first six pupils whose names headed the list of names of pupils when arranged alphabetically, but were cautioned not to skip any child because he might be especially dull or especially bright.

While each teacher was asked to interview only six pupils, it was suggested that she test as many pupils as she desired. In Ann Arbor, provision was made whereby three substitute teachers, who had been given special training in interviewing and recording the type of data desired, spent over six weeks in administering the tests. The giving of the tests was definitely supervised and all the children in Grade IA and a portion of those in the kindergarten and in Grades IB, IIB, and IIA were tested. However, in most of the cities only a portion of the children in any one grade took the tests.

The fact that in Ann Arbor the tests were given to such a large number of pupils by especially trained persons made possible a more intensive study of the data obtained in this city than that from other cities. The teachers' comments concerning the nature of the pupils' behavior while taking the tests were much more complete. Furthermore, in this city a special effort was made to determine, to some extent, the cause of some of the pupils' success in taking the test even tho they had not had in school previous instruction which would warrant success in taking the test. In this connection, a special questionnaire was sent thru the Parent-Teachers Association to parents in an effort to find out about the home instruction of the pupils, the type of games played by the children, and the type of out-of-school activities in which children engaged. It would have been very illuminating if this questionnaire had been sent to the parents of the children in other cities, but this was something of an afterthought and furthermore it is doubtful if it would have been possible to obtain such a high percentage of responses in any other city.

TABULATION OF RESULTS. The tabulation of all results has been under the supervision of the writer in the office of the Bureau of Educational Reference and Research at the University of Michigan. The teachers returned all test materials to this office where all exercises

requiring scoring were marked. Among the tabulations made were the following: those showing the total number of exercises answered correctly on the whole test and on each section of the test; those showing the total number of exercises on the whole test answered by children six years of age; those showing the percentage of children in the different cities responding correctly to each section of the test; those showing the percentage of boys and girls responding correctly to each item of the test; those showing the percentage of parents reporting types of instruction of arithmetic given in the home; and those showing the percentage of parents of the children in the different buildings reporting the types of instruction given in the home. It is possible to present only a few selected tabulations here; the remainder will appear in a complete report to be issued as a bulletin of the Bureau of Educational Reference and Research at the University of Michigan, or, as a monograph of one of the standard publishing houses.

Results

Table II indicates the names of the cities and the number of pupils in each grade taking the tests. Since most of the tests were administered during the month of May or during the early part of June, 1929, it is evident that formal instruction in arithmetic is begun in most cities at the beginning of Grade IIB. This point becomes clear when it is recalled that the instructions for giving the test asked that they be given in the grade just previous to the one in which formal instruction is begun. However, it should be pointed out that a few schools giving the tests at the beginning of this school year gave them in the grade just beginning formal instruction. It should also be pointed out that correspondence with many of the schools suggested that it is rather difficult to tell just when formal instruction begins, as provision is made for teaching some number facts in each grade and that when formal instruction is introduced this introduction is very informal. However, those responsible for the correspondence indicated that the designated grade would best meet the requirements as outlined.

Table II indicates that teachers from 39 different school systems participated in the investigation. The teachers from the following cities interviewed over 100 pupils: Ann Arbor, Flint, Fordson, Gary, Jackson, Milwaukee, New Orleans, Oakland, Port Huron, and Saginaw. The teachers in several other cities gave approximately that number of tests. Usually each teacher interviewed only six pupils, altho several interviewed more than that number. It will be noted that the number of pupils interviewed in some of the school systems was small, due to the fact that the school system itself was small and probably had but one teacher in the grade concerned. In a few cases the teacher just happened to learn about the investigation and gave the tests because of her personal interest. Incidentally, it may be added that teacher after teacher participating in the investigation commented on the fact that interviewing the children had been a most educative experience and had provided them with many interesting surprises. Oftentimes they wrote for more interview blanks.

TABLE II—NAMES OF CITIES AND NUMBER OF PUPILS IN EACH GRADE TAKING THE TEST

City	Number of Pupils					
	Grade in Which Test was Given					
	Kinder-garten	IB	IA	IIB	IIA	IIIB
Albion, Michigan	....	....	18	....	....	....
Alma, Michigan	....	....	24	....	....	....
Ann Arbor, Michigan	42	5	221	14	28	....
Arcadia, Michigan	6	....	....	....	....	....
Battle Creek, Michigan	....	....	....	....	89	....
Bay City, Michigan	....	....	17	....	....	....
Big Beaver, Michigan	....	....	5	....	....	....
Chautauqua, New York	....	....	5	....	....	....
Decatur, Illinois	....	96	....	....	....	....
Detroit, Michigan	....	....	12	....	....	....
East Detroit, Michigan	....	....	2	....	....	....
Elizabeth, New Jersey	....	....	86	....	....	....
Flint, Michigan	....	....	138	....	....	....
Fordson (Dearborn), Michigan	....	....	124	....	....	....
Frankfort, Michigan	....	....	6	....	....	....
Gary, Indiana	....	100	....	....	....	....
Hamtramck, Michigan	....	....	....	13	19	53
Highland Park, Michigan	....	....	78	....	....	....
Hillsdale, Michigan	....	49	....	....	....	....
Howell, Michigan	....	....	12	....	....	....
Ironwood, Michigan	46	....	....	....	....	....
Jackson, Michigan	....	....	111	....	....	....
Kokomo, Indiana	....	....	55	....	....	....
Leavenworth, Kansas	....	....	47	....	....	....
Lincoln Park, Michigan	....	....	22	....	....	....
Manistee, Michigan	....	....	9	....	....	....
Michigan Center, Michigan	....	2	....	....	....	....
Milwaukee, Wisconsin	....	....	503	....	....	....
Muskegon, Michigan	....	....	78	....	....	....
New Orleans, Louisiana	....	120	....	....	....	....
Oakland, California	....	....	....	....	111	....
Pontiac, Michigan	....	....	37	....	....	....
Port Huron, Michigan	....	142	....	....	....	....
Reed City, Michigan	....	....	4	....	....	....
River Rouge, Michigan	....	....	....	20	....	....
Saginaw, Michigan	....	....	131	33	....	....
Saline, Michigan	....	....	27	....	....	....
San Antonio, Texas	....	93	....	....	....	....
Traverse City, Michigan	....	....	5	....	....	....

The total number of children interviewed in the kindergarten was 94; in Grade IB, 607; in Grade IA, 1,877; in Grade IIB, 80; and in Grade IIA, 37. The number of children involved in the kindergarten and Grade IIB and the number of cities involved in Grade IIA are probably too small to have much statistical significance, but in Grades IB and IA, especially in the latter grade, the number of children interviewed and the number of school systems involved is sufficiently great to give reliability to the findings.

TABLE III—SCORES ATTAINED IN THE DIFFERENT GRADES

Score	Grade														
	Kindergarten			IB			IA			IIB			IIA		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
200–209	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1
190–199	...	...	...	...	...	...	1	...	1	...	...	...	1	1	2
180–189	...	...	...	...	1	1	2	2	4	...	...	...	3	3	6
170–179	...	...	...	1	...	1	10	8	18	1	1	2	11	7	18
160–169	1	...	1	5	...	5	27	14	41	1	...	1	17	6	23
150–159	...	...	...	3	...	3	41	26	67	3	2	5	11	17	28
140–149	...	1	1	5	3	8	83	44	127	5	2	7	22	19	41
130–139	1	...	1	9	4	13	71	56	127	1	5	6	19	14	33
120–129	1	1	2	8	7	15	81	87	168	6	3	9	13	17	30
110–119	1	...	1	14	9	23	98	80	178	4	5	9	12	14	26
100–109	1	...	1	20	18	38	83	104	187	4	5	9	6	7	13
90–99	2	1	3	19	19	38	88	113	201	3	4	7	1	8	9
80–89	2	2	4	29	21	50	93	110	203	5	4	9	3	1	4
70–79	6	7	13	41	41	82	92	94	186	4	6	10	...	...	...
60–69	5	7	12	43	31	74	58	92	150	1	2	3	...	2	2
50–59	7	6	13	32	44	76	65	69	134	...	2	2	...	...	...
40–49	7	11	18	40	34	74	23	29	52	1	...	1	1	...	1
30–39	9	9	18	36	30	66	13	10	23	...	...	...	...	...	...
20–29	2	3	5	12	19	31	5	3	8	...	...	...	...	...	...
10–19	1	...	1	5	2	7	2	...	2	...	...	...	...	...	...
1–9	...	...	...	1	1	2	...	...	...	...	...	...	...	...	...
Number	46	48	94	323	284	607	936	941	1,877	39	41	80	120	117	237
Median	55.7	51.7	53.8	68.3	63.9	66.4	103.5	95.6	99.0	113.8	105.0	108.9	142.3	136.8	138.0
Lower Quartile	39.4	40.0	39.7	46.7	45.6	46.2	77.4	73.3	75.4	87.5	80.6	84.4	125.4	118.0	121.4
Upper Quartile	75.8	70.0	72.7	91.8	85.2	88.6	130.1	120.2	123.8	140.5	127.5	131.7	151.2	153.4	156.7
Significance of Difference	1.6			0.4			1.3			1.8			—0.6		

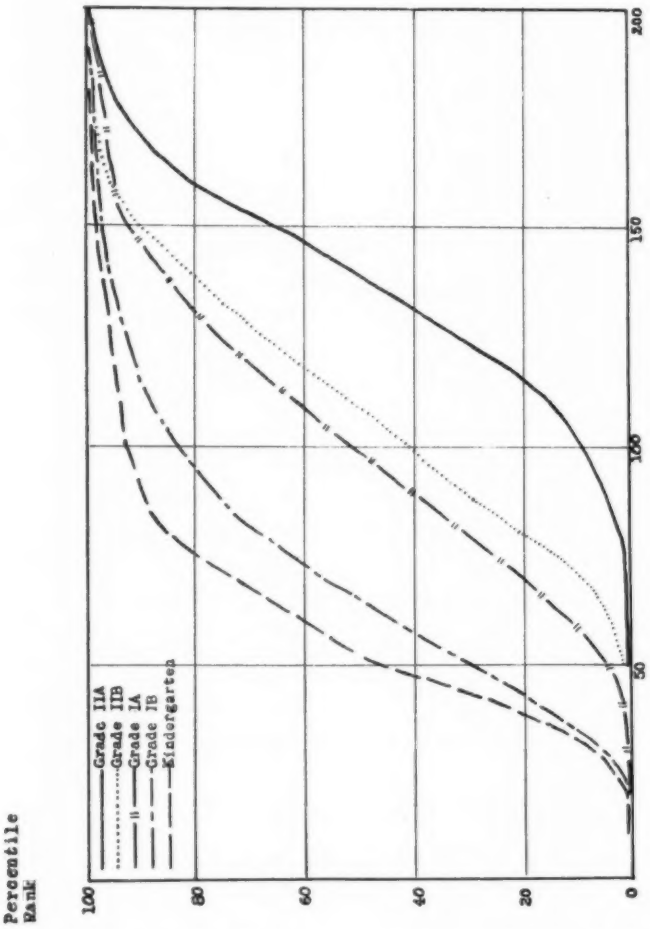


FIGURE 1. SCORES ATTAINED IN THE DIFFERENT GRADES.

Table III exhibits the distribution of the number of correct responses on the 204 items of the test made by the boys and girls in the different grades. These facts are presented in the form of percentile graph in Figure 1. Probably the most outstanding point portrayed by this tabulation and graph is the wide range in the number of correct responses given by the children who responded correctly to a very small percentage of the items of the test and some children who responded correctly to a surprisingly large percentage of the items. Some overlapping of the pupils in the different grades was to be expected, but the percentage of correct responses made by the pupils in the kindergarten and in Grades IB and IA were really surprising. Incidentally, teacher

after teacher in the Ann Arbor schools had commented to those administering the tests that it was useless to interview the children because so many of the items of the test were beyond the abilities of the children in the given grade. The median number of correct responses in the kindergarten was 53.8; in Grade IB, 66.4; in Grade IA, 95.6; in Grade IIB, 108.9; and in Grade IIA, 138.0. These medians indicate that the children in the kindergarten in which it is reasonably sure that no formal instruction in arithmetic has been given, responded correctly to one-fourth of the items; the children in Grade IA, to approximately one-half of the items; the children in Grade IIA, to approximately three-fourths of the items. The progress between Grades IB and IA and that between Grades IA and IIA is rather significant, as indicated by the wide differences between their respective medians and the percentile curves showing the achievement of the respective grades. There is not so much difference between the achievement of the children in the kindergarten and in Grade IB and between that for the children in Grades IA and IIB. This may be due to the unreliability of data for the children in the kindergarten and Grade IIB, or it may be due to the fact that the children in the B section of Grades I and II, i.e., those beginning the respective grades at mid-year, make relatively lower scores than the children entering the grades at the beginning of the regular school year. The upper and lower quartiles show wide variation in achievement in the middle fifty per cent of the pupils and consistent progress from grade to grade. Consideration of the relative achievement of boys and girls shows that boys answer correctly a greater number of items than girls. While the difference between the median scores for the boys and the girls in the different grades is approximately six or eight points, this difference becomes rather insignificant when consideration is given to the fact that there are 204 items in the test. The last row of figures in Table II, giving the indices for statistical significance, indicates that the differences in the kindergarten, and Grades IA and IIB are possible differences in favor of the boys, but the indices for the other grades suggest that there is probably no difference in the achievement of the two sexes. The fact that boys in each grade responded correctly to a greater number of items may have real significance for it will be noted in all future tabulations that the boys maintain their superiority on almost every section of the test. The difference is small, but it tends to persist, a tendency which may have more importance than the statistical formulation, based upon a small number of cases, might suggest.

Table IV is similar to Table III, but it contains the number of correct responses made by six-year-old children in the various grades. A six-year-old child was defined as one whose age was between 5 years, seven months, and six years, six months, inclusive. This tabulation reveals about the same tendencies as are presented by Table III and Figure 1, with the exception that the differences between the number of correct responses given by boys and girls in the different grades are somewhat smaller when the factor of age is kept constant. The boys, on the whole, tended to make higher scores, altho the amount of superiority is not so great as in the previous exhibits.

TABLE IV—SCORES ATTAINED BY BOYS AND GIRLS SIX YEARS OF AGE

Score	Grade														
	Kindergarten			IB			IA			IIB			Total		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
200–209	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
190–199	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
180–189	...	...	...	...	...	...	...	1	1	...	...	...	...	1	1
170–179	...	...	...	1	...	1	1	2	3	...	...	...	2	2	4
160–169	1	...	1	3	...	3	6	7	13	...	...	...	10	7	17
150–159	...	...	...	3	...	3	12	10	22	...	...	...	15	10	25
140–149	...	...	...	3	2	5	23	25	48	...	1	1	26	28	54
130–139	1	...	1	7	3	10	18	15	33	...	...	...	26	18	44
120–129	...	1	1	6	5	11	25	36	61	...	...	...	31	42	73
110–119	1	...	1	12	7	19	45	24	69	...	...	...	58	31	89
100–109	1	...	1	12	12	24	34	46	80	1	...	1	48	58	106
90–99	...	1	1	13	13	26	33	40	73	...	...	...	46	54	100
80–89	2	1	3	18	19	37	27	38	65	...	...	...	47	58	105
70–79	4	4	8	22	30	52	28	48	76	1	1	2	55	83	138
60–69	4	3	7	25	21	46	16	29	45	...	...	...	45	53	98
50–59	5	3	8	20	27	47	20	23	43	...	...	...	45	53	98
40–49	5	7	12	22	22	44	9	3	12	1	...	1	37	32	69
30–39	4	2	6	26	19	45	5	2	7	...	...	...	35	23	58
20–29	1	...	1	10	10	20	1	1	2	...	...	...	12	11	23
10–19	1	...	1	2	1	3	...	...	...	...	...	...	3	1	4
1–9	...	...	...	...	1	1	...	...	...	...	...	...	...	1	1
Number	30	22	52	205	192	397	303	350	653	3	2	5	541	566	1,107
Median	57.8	56.7	57.5	69.0	67.6	68.4	103.7	97.8	100.4	75.0	110.0	77.5	83.2	84.5	86.1
Lower Quartile	43.0	45.0	44.2	46.0	47.7	46.9	78.8	76.1	77.1	...	...	71.2	60.7	63.9	62.4
Upper Quartile	76.9	73.8	75.0	96.7	86.8	91.1	123.7	122.4	122.9	...	...	107.5	115.6	110.0	113.4
Significance of Difference	0.8			1.2			0.5			...			0.3		

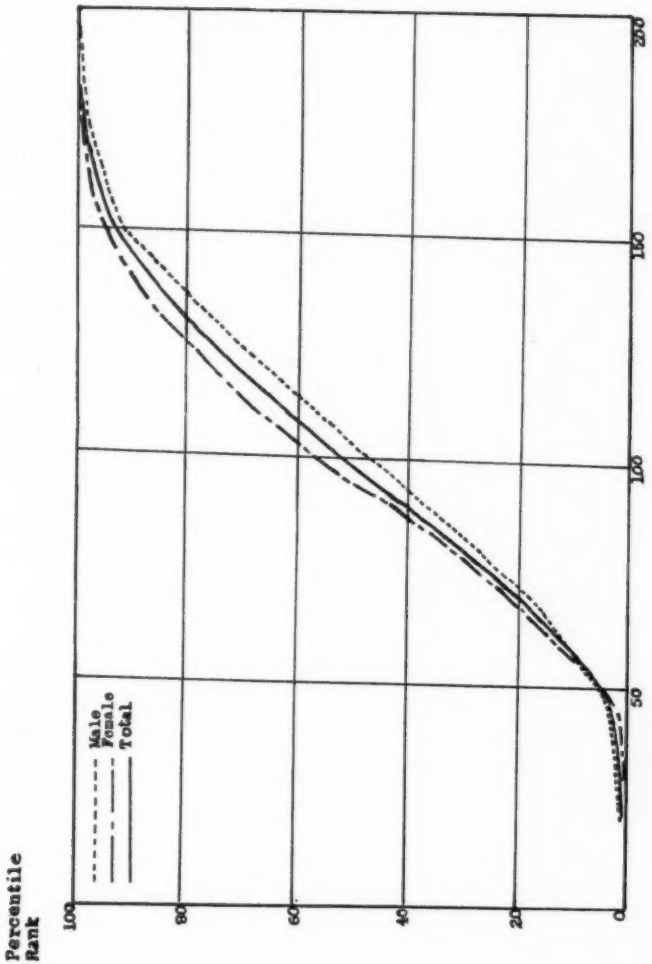


FIGURE 2. SCORES ATTAINED BY 936 BOYS AND 941 GIRLS IN GRADE 1A.

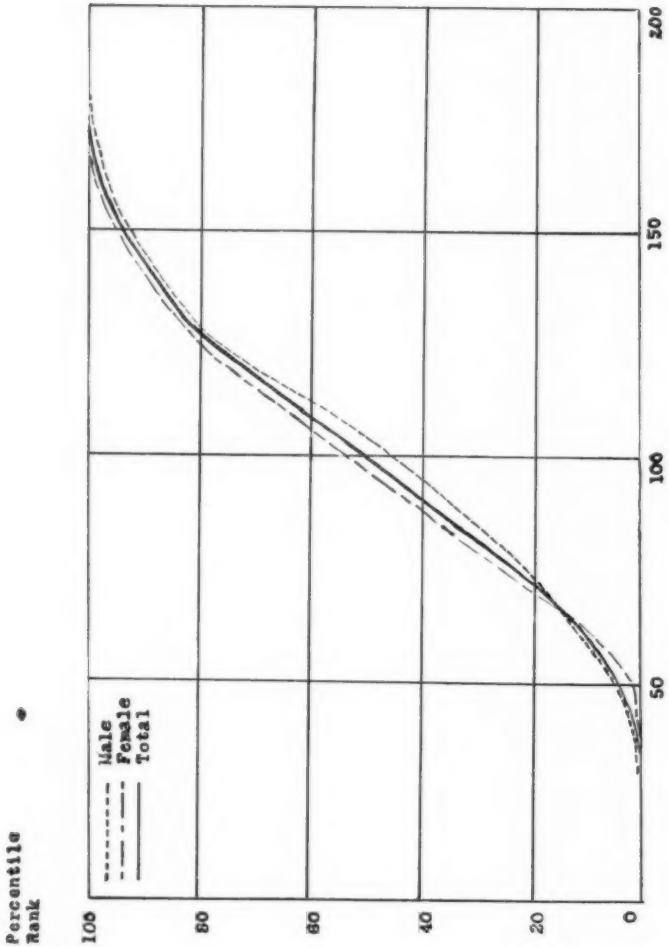


FIGURE 3. SCORES ATTAINED BY 303 BOYS AND 350 GIRLS SIX YEARS OF AGE IN GRADE 1A.

Something of the effect of holding age constant on the results achieved by boys and girls may be seen by comparison of Figures 2 and 3. Both are percentile graphs based upon the number of correct responses made by the two sexes in Grade IA. Figure 2 represents the scores attained by all children in the grade, regardless of age; Figure 3, the scores attained by only the six-year-old children. The curves, based upon Section 3 of Tables III and IV, show approximately the same tendencies. Each set of curves shows in rather vivid fashion the wide range in the number of correct responses made, but the main point of interest lies in the comparative achievement of boys and girls. In each figure the difference in the achievement of the boys and girls is represented by the amount of space between the dotted line indicating the achievement of the boys and the broken line indicating the achievement of the girls. Both sets of curves show general superiority of the boys, altho at the lower end of each set of curves somewhere between the fifteenth and twentieth percentile points the curve for the girls indicates superior achievement. The difference between the achievement of boys and girls is considerably less in Figure 3 than in Figure 2—a fact which suggests that differences in achievement are oftentimes conditioned by differences in the controls set up rather than in the achievements *per se*. As previously pointed out, the difference between the achievement of boys and girls is small; but the consistent superiority of the boys for the upper four-fifths of the percentile points, when it is considered that this same general tendency is outstanding in almost all other tabulations shown in this report, may become really significant.

Table V shows the percentage of correct responses to the various sections of the test by the children in Grade IA in eleven different cities in which the test was given. The number in parentheses after the exercises listed under the heading "Section of Test" indicates the number of items in each exercise; the numbers in the horizontal row under the heading "Pupils," the number of pupils interviewed in the designated city. Probably the most significant point about this table is the similarity of the results achieved in the different cities. Variation is noticed as one traverses the horizontal rows of percentages of correct responses made by the children in the different cities, yet similarity of performance is more outstanding than variation. In four cities, Muskegon, Kokomo, Pontiac, and Milwaukee, the general level of achievement on the different exercises is somewhat higher than in the other cities, but the exercises difficult for the children in the other cities were difficult for the children in these cities. For the six items in the exercise involving counting, the percentage of correct responses was 33 in three cities; 50, in six cities; and 67, in two cities. On the 22 items in the exercise for telling size of numbers, the percentage of correct responses in one city was 68; in six cities, 73; in two cities, 82; in two cities, 86. Similar conditions exist for the percentage of correct responses to the items in the other exercises. The percentage of correct responses on the total number of exercises, as given in the last horizontal row of figures, shows that in general the responses of the children in the different cities were fairly uniform and that the results are probably typical of conditions existing thruout the country at large.

Table VI, exhibiting the percentage of correct responses of pupils in Grade IA to the individual items in the exercise involving counting, reveals that approximately two-thirds of the pupils can count by rote to 100 by 1's and by 10's before the time of formal instruction is begun; that approximately one-third of them can count by rote to 30 by 2's, but only a small percentage of them can count to 30 by 3's or count backwards from 20 by 2's. Over 90 per cent of the children can point to the proper circle as they count the 21 circles presented in the *Pupil's Material.*

TABLE V—PERCENTAGE OF CORRECT RESPONSES BY PUPILS IN GRADE IA IN THE VARIOUS CITIES ON THE INVENTORY TEST IN ARITHMETIC

Section of Test	Ann Arbor, Mich. (221 Pupils)	Elizabeth, N. J. (86 Pupils)	Flint, Mich. (138 Pupils)	Fordson, Mich. (128 Pupils)	Highland Park (78 Pupils)	Jackson, Mich. (111 Pupils)	Kokomo, Ind. (55 Pupils)	Milwaukee, Wis. (503 Pupils)	Muskegon, Mich. (78 Pupils)	Pontiac, Mich. (137 Pupils)	Saginaw, Mich. (131 Pupils)	Total (1,666 Pupils)
Counting	33	50	50	50	50	33	67	50	67	50	33	50
Number as a Group	87	80	87	87	87	87	93	87	93	87	80	87
Reading Numbers	53	67	60	67	63	57	73	70	77	70	53	63
Size of Numbers	73	73	73	73	73	73	86	82	86	82	68	77
Telling Time	38	38	38	38	38	38	63	50	50	38	25	38
Fractions	36	55	45	55	55	55	64	55	64	64	45	55
U. S. Coins	71	76	76	71	76	76	76	76	82	76	71	76
Linear Measure	20	40	40	40	40	40	60	40	60	60	40	40
Liquid Measure	33	33	33	33	33	67	67	33	67	67	33	33
Verbal Problems	33	39	33	44	39	33	50	39	50	44	28	39
Addition Exercises	28	26	23	33	28	23	38	33	41	33	18	31
Subtraction Exercises	17	13	10	10	10	10	17	13	20	13	7	13
Total	45	47	45	49	48	45	57	51	59	53	40	49

TABLE VI—PERCENTAGE OF 968 GIRLS AND 929 BOYS IN GRADE IA RESPONDING CORRECTLY TO EACH ITEM IN THE EXERCISE INVOLVING COUNTING

Item	Girls	Boys	Both
1. Rote counting to 100 by 1's	66	67	66
2. Rote counting to 100 by 10's	67	71	69
3. Rote counting to 30 by 2's	31	37	34
4. Rote counting to 30 by 3's	7	10	9
5. Rote counting backwards from 20 by 2's	9	16	12
6. Counting and pointing to 21 circles	93	94	93
Mean Per Cent	46	49	47

The extent to which the children who did not respond correctly to the whole exercise counted indicates that they have considerable ability to count even tho they did not respond correctly to the whole exercise. However, attention should be called to the fact that much of this counting was far from automatic even tho it was eventually correct. The slight superiority of the boys in responding to each of the items in the exercise involving counting should be pointed out.

In the responses to the items involving the recognition of numbers, as a group, the children manifested a rather high degree of achievement so far as the results were concerned, as the average percentage of correct responses was 85, with variations of the different items from

TABLE VII—PERCENTAGE OF THE 968 GIRLS AND 929 BOYS IN GRADE IA RESPONDING CORRECTLY TO EACH ITEM IN THE EXERCISE INVOLVING THE RECOGNITION OF NUMBER AS A GROUP

Item	Girls	Boys	Both
1. Pointing to domino with 5 dots	77	83	80
2. Pointing to domino with 10 dots	79	80	79
3. Pointing to domino with 8 dots	82	81	81
4. Pointing to domino with 7 dots	84	82	83
5. Pointing to group of dots with 3 dots	98	99	99
6. Pointing to group of dots with 5 dots	92	92	92
7. Pointing to group of dots with 4 dots	96	96	96
8. Pointing to group of dots with 6 dots	95	95	95
9. Pointing to group of lines with 5 lines	91	90	91
10. Pointing to group of lines with 7 lines	88	84	86
11. Pointing to group of lines with 9 lines	76	74	75
12. Pointing to group of lines with 10 lines	81	78	80
13. Dividing line of stars into groups of 3	90	90	90
14. Dividing line of stars into groups of 5	81	76	79
15. Dividing line of stars into groups of 4	79	74	76
Mean Per Cent	86	85	85

75 to 96 per cent correct. While most of the children eventually gave the correct responses, the methods of arriving at the responses were most interesting. Those giving the tests observed that some of the children apparently saw the arrangements of the dots, lines, and stars in the form of groups, while others had to resort to counting. In recognizing the domino with five dots some seemed to see the two dots as a group but counted out the other three dots. These children pointed to the correct domino but they did not select immediately the domino with the five dots. In dealing with the domino having ten dots, many children counted the dots on one-half of the domino and then apparently recognized that the other half was similar. By this type of behavior these children finally gave the correct responses. Similar behavior was noticed in responding to the exercise on recognition of number items, but almost all of the responses involved counting either the total number of dots, lines, or stars, or, in a portion of the pattern. One child, in

responding to the items involving the selection of a group of nine lines, counted out five lines, measured the amount of space occupied by these lines, marked off this much space on the group of lines which he thought was the correct response and then counted the remaining lines in the group. By this type of process he finally gave the correct response. There were various other interesting types of responses but enough have been cited to warn against taking the results on this exercise as meaning that the children have mastered the "number as a group" aspect of the number concept. It should be noted that on this group of items the percentage of correct responses of the girls was slightly greater than that of the boys, except on the items involving the selection of the dominoes where the boys excelled. However, the difference of the percentages on all these items is smaller than on most of the exercises.

From Table VIII, showing the percentage of correct responses to the items in the exercise involving telling of time, it is evident that approximately half of the children in Grade IA can tell the time of day or can place the long hand on a clock to show the time of day when the time is expressed in whole hours. The first three exercises involve

TABLE VIII—PERCENTAGES OF THE 968 GIRLS AND 929 BOYS IN GRADE IA RESPONDING CORRECTLY TO EACH ITEM IN THE EXERCISES INVOLVING THE TELLING OF TIME

Item	Girls	Boys	Both
1. Clock says 9 o'clock	49	53	51
2. Clock says 1 o'clock	51	56	53
3. Clock says 12 o'clock	67	69	68
4. Clock says 3:30 o'clock	12	19	15
5. Place long hand to show it is 7 o'clock	42	47	44
6. Place long hand to show it is 5 o'clock	39	44	42
7. Place long hand to show it is 10 o'clock	41	44	43
8. Place long hand to show it is 11:45 o'clock	10	14	12
Mean Per Cent	39	43	41

merely reading of the clock, but Exercises 5, 6, and 7 require a knowledge of time relationships, in that the child must place the hands on the clock's face to indicate specified hours. Smaller percentages indicate that the exercises requiring the placing of the hands are more difficult. Only 15 per cent of the children in Grade IA were able to tell time when the hands were set at 3:30 and only 12 per cent were able to place the long hand on the clock to show that the time was 11:45. The superiority of boys on each item of this exercise is in keeping with the situation portrayed by the percentages for most exercises.

Tables IX and X, showing the percentages of correct responses to the items involving the recognition and value of coins, indicate that the children in Grade IA are familiar with the coins of less value than a dollar and that they have some understanding of the relative value of coins.

TABLE IX—PERCENTAGES OF THE 968 GIRLS AND 929 BOYS IN GRADE IA RESPONDING CORRECTLY TO THE ITEMS IN THE EXERCISES INVOLVING THE RECOGNITION OF COINS

Item	Girls	Boys	Both
1. Point to the penny	98	99	99
2. Point to the dime	97	97	97
3. Point to the quarter	85	87	86
4. Point to the nickel	95	95	95
5. Point to the half-dollar	86	89	88
Mean Per Cent	92	93	93

TABLE X—PERCENTAGE OF THE 968 GIRLS AND 929 BOYS IN GRADE IA WHO RESPONDED CORRECTLY TO EACH ITEM OF THE EXERCISES INVOLVING THE VALUE OF COINS

Item	Girls	Boys	Both
1. Which buys more, a penny or nickel?	99	99	99
2. Which buys more, a penny or dime?	98	99	98
3. Which buys more, a dime or nickel?	86	92	89
4. Which buys more, a dime or quarter?	98	98	98
5. Which buys more, a half-dollar or quarter?	94	96	95
6. How many pennies buy the same amount as a nickel?	83	87	85
7. How many pennies buy the same amount as a dime?	72	79	75
8. How many pennies buy the same amount as a quarter?	24	37	31
9. How many nickels buy the same amount as a quarter?	20	27	23
10. How many nickels buy the same amount as a dime?	52	66	59
11. How many quarters buy the same amount as a half-dollar?	28	46	37
12. How many dimes buy the same amount as a half-dollar?	8	17	12
Mean Per Cent	64	70	67

Over 95 per cent of the children pointed correctly to the penny, dime, and nickel and over 85 per cent to the quarter and the half-dollar. Almost all the children knew that a nickel, dime, or quarter would buy more than a penny or that a half-dollar would buy more than a quarter. Eighty-five per cent of the children knew that 5 pennies would buy the same amount as a nickel; 75 per cent, that 10 pennies would buy the same amount as a dime; but only 31 per cent knew that 25 pennies would buy the same amount as a quarter, and a still smaller percentage knew that 5 nickels would buy the same amount as a quarter. Fifty-nine per cent knew that 2 nickels would buy the same amount as

a dime, but only 37 per cent, that 2 quarters would buy the same amount as a half-dollar, and only 12 per cent, that 5 dimes would buy the same amount as a half-dollar. These facts indicate that the children in Grade IA know more than might be expected about coins and their values. It is most interesting to note that the boys gave as high or higher a percentage of correct responses to each of the items involving the recognition and value of coins than the girls. Those giving the tests recorded notes to the effect that quite a number of boys had helped their brothers on paper routes or in some other activities in which the value of coins received consideration. It is highly possible that the boys have a slightly wider range of social activities and that this is the cause of their superiority on the various exercises of this test. General observations on this exercise would suggest this possibility.

The scope of this paper is too narrow for exhibiting any further tabulations of the responses of the children to specific items of the other exercises of the test, but a sufficient number has been given to show the nature of the results secured. The remaining tables will deal with the results of the questionnaire sent to the parents.

Table XI presents some facts regarding home instruction in rote counting given by the parents of the children in the different school buildings in Ann Arbor. These results were tabulated by buildings because it was felt that the wide differences in the environmental conditions of different sections of the city might have some bearing on the amount of home instruction given. It is clear from this table that at least 83 per cent of the parents give their children home instruction in rote counting; 4 per cent teach their children to count by rote to 1,000; 2 per cent, to 500; 2 per cent, to 200; 54 per cent, to 100; 9 per cent, to 50; 4 per cent, to 20; and 1 per cent, to 10. Seven per cent did not specify the limit of counting instruction. Sixty-two per cent of the parents teach their children to count by rote to at least 100, and 71 per cent to at least 50. Facts did not show any outstanding differences in the home instruction given by the parents of the children in the different buildings. This was rather surprising for there is quite a difference in the social status of parents in the different school districts. This home instruction, given by the parents, is quite significant and probably accounts for the high percentage of correct responses given by the children even tho formal instruction at school has not begun.

Table XII throws more light on the cause of the high percentage of responses to many of the items in the exercises of this test. This table is a summary of the type of home instruction given by the parents of the children in the different buildings in Ann Arbor. Of the parents, 78 per cent give their children instruction in the counting of objects; 87 per cent, in the recognition of coins; and 68 per cent, in the value of money. Approximately two-thirds of the parents give instruction in the reading and writing of numbers and in solving verbal problems; approximately half give instruction involving the size of numbers, simple addition, and telling time; about one-third give instruction in simple exercises involving subtraction. Only a small percentage of the parents give instruction in exercises involving simple measurements.

TABLE XI—PERCENTAGE OF PARENTS REPORTING THE VARIOUS LIMITS OF ROTE COUNTING IN THE HOME INSTRUCTION GIVEN THE CHILDREN IN GRADE IA IN THE DIFFERENT BUILDINGS OF THE ANN ARBOR PUBLIC SCHOOLS

Upper Limit of Teaching Effort	Schools							
	I 19 Replies	II 27 Replies	III 13 Replies	IV 24 Replies	V 20 Replies	VI 24 Replies	VII 37 Replies	Total 164 Replies
1,000	5	....	....	....	....	8	8	4
500	....	7	....	4	....	....	....	2
200	....	7	....	....	....	8	....	2
100	68	48	46	50	60	46	59	54
50	5	11	23	12	10	12	....	9
20	....	4	15	8	5	....	3	4
10	....	4	....	....	....	4	....	1
Number not specified	....	7	....	12	15	12	3	7
No effort	5	....	....	4	....	....	3	2
No reply	16	11	15	8	10	8	24	14

TABLE XII—PERCENTAGE OF PARENTS REPORTING VARIOUS TYPES OF HOME INSTRUCTION GIVEN THE CHILDREN IN GRADE IA IN THE VARIOUS BUILDINGS OF ANN ARBOR PUBLIC SCHOOLS

Type of Instruction	Schools							
	I 19 Replies	II 27 Replies	III 13 Replies	IV 24 Replies	V 20 Replies	VI 24 Replies	VII 37 Replies	Total 164 Replies
Counting Objects	84	85	85	79	85	79	62	78
Recognition of Coins	89	96	85	92	90	92	70	87
Reading Numbers	53	74	69	62	70	75	65	67
Writing Numbers	53	85	62	75	75	75	51	68
Relative Size of Numbers	47	44	62	50	65	58	33	49
Addition of Simple Combinations	63	52	46	46	70	54	57	55
Subtraction of Simple Combinations	37	30	38	42	45	20	34	35
Telling Time	58	78	54	29	45	50	65	55
Measuring	10	7	8	12	15	12	3	9
Value of Money	79	85	85	54	65	75	49	68
Solving Verbal Problems	53	70	62	71	60	79	51	63
Miscellaneous	32	15	15	17	25	21	19	21

Space does not permit the listing of the games and activities engaged by children in their home life thru which they learn counting, addition, subtraction, the value of money, etc., but it may be added that these games and activities provide a great deal of the knowledge of arithmetic responsible for the high percentage of correct responses to the various items in the exercises of this test. Children may not have formal instruction at school, but often they have had formal instruction in the home and have participated in many games and activities designed primarily for teaching them the elementary facts of arithmetic.

Summary and Conclusions

From the study as a whole there are three important conclusions: (1) young children possess a considerable knowledge of arithmetic before the time for beginning the formal instruction in the subject; (2) even tho the children arrived at the correct responses to the various situations set, many of them responded very slowly and often by tedious and circuitous routes; (3) the home life of the child, with its formal and incidental instruction, has real significance in the development of the child's knowledge of arithmetic and arithmetical processes.

From these conclusions, it seems wise to add two implications: (1) the lack of automatic responses and the utilization of circuitous methods of arriving at the correct responses suggests that there is definite need for instruction in the type of exercises constituting the tests, even tho a surprisingly large percentage of the children gave the correct responses; (2) the great amount of knowledge of arithmetic possessed by the children in the kindergarten and in Grades I and II and the variation in the achievement of the children in each of these grades suggests the value of making an extended inventory of the knowledge and skills possessed by the children of a particular grade before beginning instruction in that grade.

INVENTORY TEST IN ARITHMETIC TO BE GIVEN TO PUPILS AT THE TIME WHEN FORMAL INSTRUCTION IN ARITHMETIC IS BEGUN

A Proposed Investigation

THIS Inventory Test in Arithmetic has been designed for use in an investigation to throw light on curriculum building in the primary grades and is not intended as a test for measuring levels of achievement. The test has been prepared for determining as completely as possible the types and amounts of arithmetic which pupils in the primary grades know at the time when formal instruction in arithmetic is introduced. The time of beginning formal instruction in arithmetic varies. In most schools this type of instruction is introduced at the beginning of Grade II; in others it is postponed until the beginning of the second semester of Grade II or even to the beginning of Grade III; in still others it is introduced not later than the beginning of the second semester of Grade I and may even be started near the beginning of the first semester of Grade I. The time at which formal instruction in arithmetic is begun

signifies the time when there is a definite period in the regular teaching schedule set aside for presenting the number facts and concepts according to a definitely systematized plan. This emphasis on systematized instruction in a period specifically set aside for the purpose differentiates the formal type of instruction from the incidental type which is given in response to the number needs of given situations. Formal instruction, although definitely planned and organized, does not necessitate the use of a textbook.

In this investigation it is proposed that the inventory test be given at or near the time when formal instruction is begun. This means that if formal instruction is introduced at the beginning of Grade II the tests should be given in Grade IA during the last week of May or to the pupils in Grade IIB during the first week of school, next September. If the time for beginning formal instruction varies, then there must be similar variation in the time for the administration of the inventory test. The exact time for giving the test must be determined by the teachers and school officials within a given school system.

In this investigation it is proposed to have different primary teachers in the various school systems of this and of other states interview six of their pupils at the time when formal instruction is introduced and make complete records of the responses which the children make to different items of the test. Since this test is an interview test, it must be administered individually.

Directions for the Teacher's Interview

GENERAL INSTRUCTIONS. The purpose of this test is to determine the types and amounts of arithmetic which the children under consideration really know. Thus the test contains a great variety of number situations possessing various degrees of difficulty. The test is planned so that those pupils beginning formal instruction early can respond correctly to many exercises from their limited number experiences and so that those beginning instruction late cannot respond correctly to all of the exercises, even though they may have had much number experience.

Complete directions for giving each exercise of the test and recording the responses made by the pupils are given in the body of the test itself. The teacher should give each exercise of the test to the pupil, although it is obvious that if the pupil cannot respond correctly to the easy items of an exercise it is useless to test him on the harder items. Whenever the pupil manifestly cannot do any item of a given exercise, try him on the next exercise. Give the pupil a thorough trial on every exercise in order to gain a complete inventory of his knowledge of arithmetic, but do not waste time when it is obvious that he cannot give proper responses. Record the pupil's response to each item of an exercise. As soon as the pupil gives a response, make the appropriate entry in the space provided for that purpose, but be careful when giving the test to avoid signs of approval when the correct answer is given or of disapproval when the wrong answer is given. Notice that the test has been divided into three parts so that the pupil will not become fatigued.

After finishing Part I, be sure to give the pupil an ample rest period before starting Part II. Likewise give him a rest period between Parts II and III.

In administering the test, be sure to provide yourself with a copy of the *Pupil's Material* for it will be needed in connection with the giving of some of the exercises. Furthermore, be sure that the test blank and the *Pupil's Material* are properly labelled and filed together. In interviewing the pupil, be sure that the pupil being interviewed is isolated so that the other pupils cannot see or hear the interview.

SELECTING THE PUPILS TO BE INTERVIEWED. When the time for interviewing the pupils arrives, select only those pupils who have all their training within the given system and only those who have made regular progress. Arrange the names of the pupils alphabetically according to their last names. Beginning at the top of the list, select the names of the first six pupils. These are the pupils whom you are to interview. If you wish to interview more than six pupils, simply move further down the list taking the names of the pupils in the order in which they come. Do not skip any pupil because he happens to be especially dull or select another because he happens to be especially bright. While you are asked to interview but six pupils, those making the investigation will be pleased to receive interview blanks from all your pupils.

SUPPLEMENTARY RECORD. The method by which the pupil arrives at his response is often more illuminating than the answer which he finally gives. Therefore it will be very helpful if the one making the interview will make notes on the blank spaces under each exercise and record any impressions obtained concerning the method employed by the pupil in arriving at the answer. To illustrate, when you asked the pupil to point to the domino having a given number of dots on it, did he have to count all of the dots, a part of the dots, or did he see the dots arranged in a group and respond without counting? How did he recognize the groups of lines or stars? If you know the pupil's home and social environment well enough to comment on the special advantages or disadvantages which he has had, be sure to comment on these. If you know whether the parents have taught the pupil, whether the brothers and sisters have played school, whether the pupil runs errands for his parents, whether he plays games with older children, or does anything which might give a mastery of the number facts, kindly make a specific note to that effect on the back of the test blanks.

Name of Pupil..... Age..... Grade..... I. Q.....

City..... Building..... Teacher..... (indicate section)

Did pupil attend kindergarten?..... Number of semesters.....

Teacher's estimate of pupil's mental ability.....

Note: Examiner may say to the pupil: "We are going to have a little game to see how much you know about arithmetic." All directions are to be given orally by the interviewer.

PART I

Exercise 1. Rote Counting without Objects

Have the pupil count by 1's; later by 10's, 2's, and 3's; and then backwards by 2's. In each of these counting exercises use this formula of directions: Say to the pupil, "Begin counting 1, 2, 3, and go as far as you can or until I stop you." In using this formula do not indicate more than three steps in any counting exercise. Give the pupil one trial on each of the counting exercises and do not record him as being able to do any exercise on which he has to correct himself more than three times in the trial given him..

1. Can the pupil count to 100 by 1's?..... If not, how far? .....
2. Can the pupil count to 100 by 10's?..... If not, how far? .....
3. Can the pupil count to 30 by 2's?..... If not, how far? .....
4. Can the pupil count to 30 by 3's?..... If not, how far? .....
5. Can the pupil count backwards from 20 by 2's?..... If not, how far?.....

COMMENTS:

Exercise 2. Counting by Enumeration

Place before the pupil that section of the *Pupil's Material* presenting a row of circles. Have the pupil count these circles by pointing with a pencil or his finger at each circle as he enumerates it. Show him by counting not more than three circles. If he becomes confused in his counting, the number after which this occurs is his score. If he cannot count circles in the manner asked, provide 20 small objects like beans, kindergarten beads, pennies, pencils, or small blocks and see if he can count them.

1. Can the pupil count the 20 circles as directed?..... If not 20, how many?.....
2. If small objects were used, can the pupil count the 20 objects as directed?..... If not 20, how many?.....

COMMENTS:

Exercise 3. Recognition of Number as a Group

Place before the pupil that section of the *Pupil's Material* presenting the series of dominoes, dots, lines, and stars. Have the pupil attempt to do what each command asks him to do. If he performs the command correctly, write YES on the blank after the command; if he does not, write NO.

Dominoes

1. Point to the domino on which there are only five dots.....
2. Point to the domino on which there are only ten dots.....
3. Point to the domino on which there are only eight dots.....
4. Point to the domino on which there are only seven dots.....

COMMENTS: How did the pupil recognize the different groups called for? Did he recognize the groups at a glance?..... Or did he have to count?..... Or did he recognize some group patterns and determine the size of the group by counting the remaining parts of the total pattern?..... Record any interesting observations made.

Dots and Lines

1. Point to the group of dots that has only three dots.....
2. Point to the group of dots that has only five dots.....
3. Point to the group of dots that has only four dots.....
4. Point to the group of dots that has only six dots.....
5. Point to the group of lines that has only five lines.....
6. Point to the group of lines that has only seven lines.....
7. Point to the group of lines that has only nine lines.....
8. Point to the group of lines that has only ten lines.....

COMMENTS: Did the pupil recognize the groups at a glance?..... Or did he have to count?..... Or did he recognize some group patterns and determine the size of the group by counting the remaining parts of the total pattern?..... Record any interesting observations made.

Stars

1. Beginning at the left, divide the first line of stars into groups of three by drawing circles around each group of three.....
2. Beginning at the left, divide the second line of stars into groups of five by drawing circles around each group of five.....
3. Beginning at the left of the line of stars and dots, divide it into groups of four by drawing circles around each group of four.....

COMMENTS: Did the pupil count each star separately in making the group?..... Or did he recognize the stars in groups?..... Add other comments.

Exercise 4. Reading Numbers

A. Place before the pupil that section of the *Pupil's Material* containing a calendar and the row of numbers. Have the pupil attempt to do what each command below asks him to do. If he performs the command correctly, write YES on the blank after the command; if he does not, write NO.

Pointing to Numbers on the Calendar

1. Point to figure three.....
2. Point to figure eight.....
3. Point to figure six.....
4. Point to figure eleven.....
5. Point to figure twenty-three.....
6. Point to figure twenty-eight.....

COMMENTS:

Pointing to Numbers in the Row of Numbers

1. Point to number thirty-seven.....
2. Point to number nineteen.....
3. Point to number seventy-two.....
4. Point to number forty-one.....
5. Point to number one hundred thirty-one.....
6. Point to number one hundred thirteen.....

COMMENTS:

B. Place before the pupil that section of the *Pupil's Material* containing the columns of numbers labelled "Numbers for Reading," which correspond to the columns of numbers given below. Have the pupil read orally each column of numbers. As he reads the numbers write YES after each number read correctly and NO after each number read incorrectly. In scoring do not count a number read correctly unless read according to units, tens, hundreds, and thousands, e.g., thirteen, one hundred twenty-three, one thousand three hundred twenty-five.

13.....	123.....	1,325.....
21.....	357.....	2,764.....
70.....	791.....	1,025.....
57.....	958.....	10,103.....

COMMENTS:

C. Finding pages in a book. Have the pupil find the pages enumerated below. Score as in the items above.

1. Open the book to page thirteen.....
2. Open the book to page twenty-one.....
3. Open the book to page seventy.....
4. Open the book to page fifty-seven.....
5. Open the book to page eighty-nine.....
6. Open the book to page one hundred twenty-three.....

COMMENTS: Did the pupil experience difficulty in finding the pages?..... What was his behavior in finding the pages?.....

THIS IS THE END OF PART I. GIVE THE PUPIL A REST PERIOD BEFORE STARTING PART II

PART II

Exercise 5. Size of Number

A. Ask the pupil each of the questions below. If he answers correctly, write YES on the blank after the question; if he answers incorrectly, write NO.

Number With Concrete Objects

1. Which is more, 3 apples or 5 apples?.....
2. Which is more, 5 pennies or 8 pennies?.....
3. Which is more, 13 pennies or 17 pennies?.....
4. Which is most, 11 cookies, 7 cookies, or 9 cookies?.....
5. Which is more, 33 pieces of candy or 25 pieces of candy?.....
6. Which is less, 7 pennies or 5 pennies?.....
7. Which is less, 33 marbles or 29 marbles?.....
8. Which is more, 95 marbles or 149 marbles?.....

Number in the Abstract

1. Which is more, 3 or 5?.....
2. Which is more, 5 or 8?.....
3. Which is more, 13 or 17?.....
4. Which is less, 15 or 22?.....
5. Which is "biggest," 25, 29, or 19?.....
6. Which is "smallest," 37, 33, or 52?.....
7. Which is more, 39 or 44?.....
8. Which is more, 95 or 149?.....
9. Which is "biggest," 89, 128, or 98?.....
10. Which is "smallest," 121, 78, or 229?.....

COMMENTS:

B. Place before the pupil that section of the *Pupil's Material* containing four rows of numbers. Have the pupil attempt to do the commands given below. If he performs the commands correctly, write YES on the blank after the command; if he does not, write NO. If a pupil stops before he has finished an exercise, encourage him to continue by asking if he has drawn a line through all numbers "bigger" or "smaller" than the indicated number.

1. In the first row of numbers take your pencil and drawn a line through *all* numbers "bigger" than 9.....
2. In the second row of numbers draw a line through *all* numbers "bigger" than 11.....
3. In the third row of numbers draw a line through *all* numbers "smaller" than 17.....
4. In the fourth row of numbers draw a line through *all* numbers "bigger" than 25.....

COMMENTS: In the space below record any outstanding method of response. This may be obtained at times from watching him make his responses; at other times, by asking him to tell you why he marked out certain numbers.

Exercise 6. Telling Time

Place before the pupil that section of the *Pupil's Material* representing the clocks. Ask him to answer the questions or carry out the instructions given below. If he answers the question or carries out the instruction correctly, write YES on the blank after the question or instruction; if incorrectly, write NO. (Examiner should point to the appropriate clock as she asks the question or gives the command.)

1. What time does this first clock say?.....
2. What time does this second clock say?.....
3. What time does this third clock say?.....
4. What time does this fourth clock say?.....
5. Place the long hand on this fifth clock to show that it is seven o'clock.....
6. Place the long hand of this sixth clock to show that it is five o'clock.....
7. Place the long hand on this seventh clock to show that it is ten o'clock.....
8. Place the long hand on this eighth clock to show that it is 15 minutes till twelve o'clock.....

COMMENTS:

Exercise 7. Fractions

Place before the pupil that section of the *Pupil's Material* representing apples cut into various fractional parts. Ask him to answer the questions or carry out the instructions given below. If he answers the question or carries out the instruction correctly, write YES on the blank after the question or instruction; if incorrectly, write NO.

1. Point to the picture of the apple which is cut into halves. .....
2. Point to the picture of the apple which is cut into fourths. .....
3. Point to the picture of the apple which is cut into thirds.....
4. Into how many halves can you cut an apple?.....
5. Into how many fourths can you cut an apple?.....
6. Into how many thirds can you cut an apple?.....
7. Which is larger, a whole apple or a half of an apple?.....
8. Which is larger, a fourth of an apple or a half of an apple? .....
9. Which is larger, a half of an apple or a third of an apple? .....
10. Which is larger, a fourth of an apple or a third of an apple? .....
11. Which is largest, a half of an apple, a third of an apple, or a fourth of an apple?.....

COMMENTS:

Exercise 8. Units of Measure

UNITED STATES MONEY

Recognition of Coins

Place on the table before the pupil a penny, a nickel, a dime, a quarter, and a half-dollar. Ask the pupil to carry out the instructions given below. If he carries out the instruction correctly, write YES on the blank following the instruction; if incorrectly, write NO.

1. Point to the penny.....
2. Point to the dime.....
3. Point to the quarter.....
4. Point to the nickel.....
5. Point to the half-dollar.....

Value of Coins

Ask the pupil each of the questions below. If he answers the question correctly, write YES on the blank after the question; if incorrectly, write NO.

1. Which will buy more, a penny or a nickel?.....
2. Which will buy more, a penny or a dime?.....
3. Which will buy more, a dime or a nickel?.....
4. Which will buy more, a dime or a quarter?.....
5. Which will buy more, a half-dollar or a quarter?.....
6. How many pennies will buy the same amount as a nickel? .....
7. How many pennies will buy the same amount as a dime? .....
8. How many pennies will buy the same amount as a quarter? .....
9. How many nickels will buy the same amount as a quarter? .....
10. How many nickels will buy the same amount as a dime? .....
11. How many quarters will buy the same amount as a half-dollar? .....
12. How many dimes will buy the same amount as a half-dollar? .....

COMMENTS:

LINEAR MEASURE

Give the pupil a ruler and a piece of chalk and then ask him to carry out the instructions given below. If he carries out the instruction correctly, write YES on the blank after the instruction; if incorrectly, write NO.

1. Using the ruler draw, on the blackboard or your desk, a line a foot long.....
2. Using the ruler draw, on the blackboard or your desk, a line six inches long.....
3. Using the ruler draw, on the blackboard or your desk, a line three inches long.....

4. Using the ruler draw, on the blackboard or your desk, a line two feet long.....
5. Using the ruler draw, on the blackboard or your desk, a line a foot and a half long.....

COMMENTS:

LIQUID MEASURE

Ask the pupil the questions below. If he answers correctly, write YES on the blank after the question; if incorrectly, write NO.

1. Which holds more, a pint bottle or a quart bottle?.....
2. How many pints will a quart bottle hold?.....
3. How many quarts in a gallon?.....

COMMENTS:

Exercise 9. Verbal Problems

Read these problems to the pupil. Ask him to give the answer asked. If he gives the correct answer, write YES on the blank after the exercise; if the wrong answer, write NO.

1. How many pennies are 2 pennies and 1 penny?.....
2. How many pennies are 3 pennies and 2 pennies?.....
3. How many pencils are 5 pencils and 4 pencils?.....
4. How many tops are 5 tops and 6 tops?.....
5. How many pencils are 3 pencils, 4 pencils, and 2 pencils?.....
6. How many ice-cream cones are 8 ice-cream cones and 5 ice-cream cones?.....
7. How many balls are 5 balls, 4 balls, and 3 balls?.....
8. How many balls are 12 balls and 6 balls?.....
9. How many pennies are 24 pennies and 8 pennies?.....
10. How many pennies will buy the same amount as a dime and a nickel?.....
11. How many pennies will buy the same amount as a quarter and a dime?.....
12. If you have 2 pennies and give 1 penny away, how many pennies do you have left?.....
13. If you have 10 cents and spend 5 cents, how many cents do you have left?.....
14. If you have 7 apples and give away 3 apples, how many apples do you have left?.....
15. If you have 9 apples and give away 5 apples, how many apples do you have left?.....
16. If you want 7 pencils and have only 5 pencils, how many more pencils do you have to have?.....
17. If you have a quarter and spend a dime, how much money do you have left?.....
18. If you have a quarter, your mother gives you a dime, and then you spend fifteen cents, how much money do you have left? .....

COMMENTS:

THIS IS THE END OF PART II. GIVE THE PUPIL A REST PERIOD BEFORE STARTING PART III

PART III

Exercise 10. Addition Exercises

Place before the pupil the addition exercises in the *Pupil's Material* and ask him to add as many of these exercises as possible. Allow him opportunity to add each exercise if he desires. If he cannot add the exercises in one line, encourage him to try those in the next line. When it becomes evident that he has solved all the exercises he can, ask him to try the exercises in subtraction.

COMMENTS: Record any outstanding features of the methods employed in the attempt at addition.

Exercise 11. Subtraction Exercises

Place before the pupil the subtraction exercises in the *Pupil's Material* and ask him to subtract as many of these exercises as possible. If he cannot subtract the exercises in one line, encourage him to try those in the next line. When it becomes evident that he has solved all the exercises he can, take up his paper.

COMMENTS: Record any outstanding features of the methods employed in the attempt at subtraction.

Note: Be sure that the *Pupil's Material* is filed with the teacher's record of the interview.

PUPIL'S MATERIAL

Name of Pupil .....Age.... Grade.....I. Q.....
(indicate section)

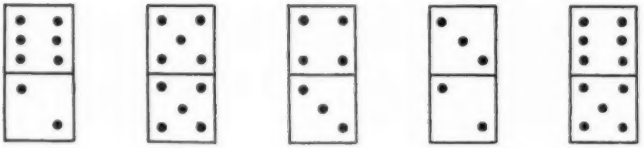
City .....Building .....Teacher.....

PART I

Exercise 2. Counting by Enumeration

Exercise 3. Recognition of Number as a Group

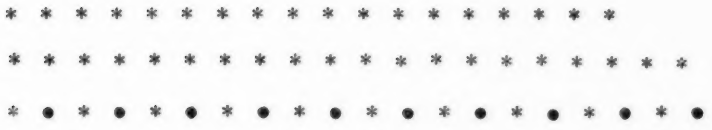
Dominoes



Dots

Lines

Stars



Exercise 4. Reading Numbers

1929		JANUARY				1929
SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Row of numbers	113	37	72	37	41	131	19

Numbers for Reading

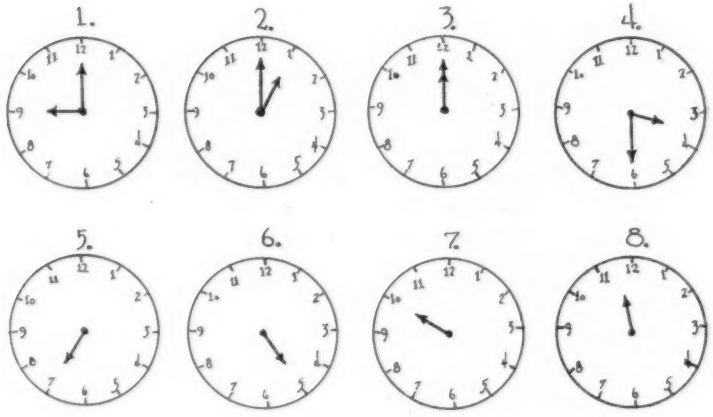
13	123	1,325
21	357	2,764
70	791	1,025
57	958	10,103

PART II

Exercise 5. Size of Number

1st Row	1	16	21	3	29	33	23	9
2nd Row	12	8	15	5	10	21	19	14
3rd Row	4	17	9	19	23	6	12	27
4th Row	6	27	11	56	99	1	15	9

Exercise 6. Telling Time



Exercise 7. Fractions

PART III

Exercise 10. Addition Exercises

2	0	6	1	2	7	6	5
1	2	2	7	2	1	3	4
5	6	3	9	5	5	9	7
7	4	9	1	8	5	8	6
2	4	2	4	5	2	4	2
3	1	3	3	1	4	5	5
2	2	1	2	3	9	9	8
12	14	21	17	12	16	29	38
3	4	7	2	8	5	4	9

22	41	54	57	324	576	987
13	15	33	84	453	425	456
31	23	12	79		358	321
						237

Exercise 11. Subtraction Exercises

7	4	8	3	6	5	7	9
1	2	8	1	0	4	3	5
12	15	24	29	10	12	15	12
1	3	2	5	1	2	5	8

24	20	38	79	748	365	967
12	10	15	35	128	104	545
40	55	32	76	487	87654	694521
11	45	18	27	139	56938	346978

Supervision in the Elementary Schools

BLANCHE FUQUA, Elementary Supervisor, Terre Haute

I HAVE no case studies, no questionnaires, and no mimeograph material to discuss with you, so I will plunge at once into the subject of supervision.

The most important factor in determining the success of a supervisory program is the teacher. Since this is a teacher-training section, let us consider some points concerning the *prospective* teacher who is to be admitted to a teacher-training institution.

First, is there not someone in each high school in the state who can discover the presence or lack of professional and social aptitudes for teaching before the student enters the school for training? Is there not someone who can determine whether the student has profited by his four years in high school and has the background of literature and history and the willingness and ability to study and work out problems for himself?

Second, each supervisor here will agree with me that children will not have the problems with new teachers that they now have when theory is more closely integrated with practice. This program of improvement in training is being developed at Terre Haute in the Indiana State Teachers' College. I know of no single feature of the work which will improve our school program so much as to have clear in the young teacher's mind the agreement between theory, fundamental principles, and teaching procedures. Since I have had the privilege of helping about 96 new teachers over this difficulty, I know it is a vital point. Over and over the young teacher says to me: "Now I begin to see what they were talking about." I find the experienced teacher anxious to secure the new books on method and anxious to change her teaching to conform with modern methods when, thru a program of study or a program of standard and informal testing, she begins to grow critical of her work.

The next factor in importance is the direction given the teacher. This direction may follow these lines: issuing regulations, providing patterns to imitate, and providing a program of study, experimentation, and research. Just as we have levels of teaching suggested by Breuckner in the First *Yearbook* on Supervision, so levels of supervisory practice will be developed from the surveys made this year by the Department of Superintendence, International Kindergarten Union and Elementary School Principals' Section. One has only to study the Third *Yearbook* on Supervision to see that our general level of supervisory practice is not as high as it should be. An editorial in *Educational*

Method says: "The supervisors of the country are the Marthas out in the kitchen looking after the materials, tests, teacher ratings, and all the difficult jobs in the school system; they are not the Marys taking the real overview of the whole school situation as is really needed if children and teachers make the growth possible."

I want to indicate one level of supervisory practice. However, you may only consider it an intermediate level. A supervisor must think thru her situation and analyze and select for attention weak spots or new needs, having as clear a picture of her problems in mind as possible thru visits of inspection, making surveys, gathering teachers' problems, anticipating teachers' difficulties, and suggesting specific steps for overcoming these difficulties.

Next she must plan a program which calls for professional activity, directed toward achieving the mastery of these specific steps. A necessary feature of this plan must be fitting this into the general policy of all supervisors in the system. When a council of supervisors perfects this plan, some statement must go to all concerned to show definitely what has been selected for improvement, why it has been selected, and what means will be used in checking on the success or failure of the proposed plans.

In an analysis of the situation, the supervisor cannot possibly see all the needs and the teacher may not be willing to suggest all her needs, but if one collects from teachers a series of problems they will possibly follow these lines: What is wrong with my teaching? How can I get my children to want to speak distinctly? How can I develop a real audience situation? How can I take care of the lip-lazy children, etc.?

The supervisor may see the same problems stated in a different form as: Are we getting the right initial emphasis on reading? Are we right in requiring kindergarten attendance? Should we attempt to have uniform requirements for promotion in reading? What reading materials are needed in the various buildings? How has the size of classes affected results? What level of teaching may I expect from each teacher? What service can I give in group conferences which does not call for duplication in individual conferences?

Let us see what work we have done on just one point—the value of the kindergarten to the reading program. A survey of promotions, and non-promotions with relation to attendance in kindergarten showed that a large group of pupils who had not been promoted in the 1B grade had had no kindergarten training. This led to the adoption of the rule that at least one term of kindergarten attendance should be required of each child entering our 1B grades. Since this kindergarten attendance is to create an interest in reading and a desire to read, an emphasis has been placed on experiences that lead to developing a speaking vocabulary which includes the reading vocabulary to be mastered later. Emphasis was placed on contacts with stories and poems, on facility with ideas and words, and on various exercises to develop the desire to read. Such a program has developed a power in the 1B child which makes the per cent of failures in the 1B grade about 6 per cent lower than it was before kindergarten attendance was required.

In the *Indiana Teacher* for October, 1928, Dr. Gray discusses these levels of teaching reading:

1. Instruction in reading period.
2. Activities in reading period.
3. Wider reading in all subjects.
4. Guidance in reading habits.
5. Units of work.

He says "a sixth level of teaching is illustrated in those schools which provide pupils opportunity to read widely for recreation and to engage in independent reading and study. The one type of reading is provided by schools which permit pupils to go regularly to the reading table or the library primarily to satisfy interest and to derive pleasure and satisfaction. This type is provided by teachers who encourage pupils as early as the third and fourth grades to select problems for individual study and investigation and to prepare coherent reports with such guidance from the teachers as may be necessary. These opportunities insure the establishment of permanent habits of reading and the cultivation of efficient habits in independent reading projects."

The following plan used in Grade 8, by Ruth Campbell, at the Deming School, will show how this level of teaching may be worked out. The material is "The Legend of Sleepy Hollow." The objectives are: to understand and enjoy the story, to appreciate the humor, to appreciate Irving's ability to describe, to stimulate interest in short stories, and to improve speed in comprehension with the slow group. The procedure, briefly stated, is: *exploration* (find what the children know about early Dutch settlers and Irving); *presentation* (create atmosphere and stimulate interest by the use of Hudson River Travelog pictures of early Dutch settlers and of Sleepy Hollow region, complete the history of the early Dutch settlers along the Hudson started in the exploratory step, and tell enough of the life of Irving to show how he acquired his interest in and his knowledge of these early settlers and of the Sleepy Hollow region); *silent reading and study* (prepare four contracts to provide for individual differences: these increase in difficulty and give practice in selecting, evaluating, and organizing; the last contract calls for further practice in study of setting, plot, and characters in additional stories such as Irving's *The Alhambra*); *recitation* (consists of committee reports from groups working on the various contracts). This brief statement of the unit plan of teaching reading is given to show that the breadth and scope of our reading program precludes the possibility of giving any brief statement of the situation. At any stage it must be guidance which promotes purposeful reading of an acceptable variety of materials.

Our *Activities Bulletin* has attempted to show the place of a variety of materials in developing a reading program.

Each supervisor should ask herself "to what degree am I responsible for any remedial work needed in this field?" If too much empha-

sis is placed on word recognition in the first grade, word calling will probably appear in the second grade. A successful reading program has no place for an opinionated and dictatorial supervisor who forces various teaching methods which later call for remedial teaching.

A survey of the types of supervisory service in the field of reading used during a year may be helpful.

1. Seeing other teachers at work.
2. Having demonstration lessons with discussion and summaries put in the hands of the teachers.
3. Using mimeograph copies of actual lessons and studying the manual.
4. Developing diagnostic procedures in connection with the regular work.
5. Trying out new materials in one building.
6. Increasing materials (The Library Manual and Equipment List).
7. Providing materials for use of the teacher, such as the *Classroom Teacher*.
8. Challenging the efforts of the teachers in producing materials, committees on informal tests, and committees on course of study.
9. Keeping a supervisory file on reading.
10. Having a growing supervisor who is familiar with professional literature, books on methods, courses of study, such magazines as *Elementary English Review*, and the various studies in the field.

There are five basic principles which I suspect we as supervisors accept, but whether they always appear as guiding principles in our procedure is another matter. These principles are: first, supervision reaches out beyond the issues of education and tries to understand the issues of society in which education develops. Since our whole social structure is constantly changing, youth today demands many suggestions for the solutions of their problems. There must be a constant evaluation of the aims and objectives of our work. Second, supervision must work toward a common end. This means that, for the child's good, every supervisory officer must direct his effort toward the attainment of ends agreed upon. Supervision must be coöperative. Third, supervision must seek out the best in every teacher, stressing success, encouraging initiative and originality, self-reliance, and self-expression. It must be creative, not dictatorial. Fourth, supervision must stimulate critical thinking and encourage experimentation. It must seek out the truth of its own accomplishment. It must be scientific. Fifth, supervision must help teachers use the available tools, tests, books, and equipment, and must help them improve these tools. It must help them improve theory by refining efforts and procedures used to make the theory effective. A committee of supervisors asked several groups of teachers to write three "don't's" for supervisors, more as a joke on themselves than for any other reason. It proved to be anything but humorous when these were analyzed. A study of these "don't's" leads me to add this sixth basic principle. Supervision must take more account of the human element. Here are some of the teachers' "don't's":

1. Don't forget the teacher is responsible to several supervisors.
2. Don't expect the teachers to do your work.
3. Don't expect more than you can do yourself.
4. Don't give petty criticisms.
5. Don't produce worry and mental strain.
6. Don't assume that the teachers do not want to excel.
7. Don't be narrow, seeing only your own viewpoint.

These show how closely the human element, common sense, and the scientific side must be blended if our work is successful.

The Supervisor of Arithmetic from the Standpoint of the Special Supervisor

FRANCES MASON, Elementary Supervisor, South Bend

THREE years ago arithmetic was the major problem on our supervisory program for the year. To most of the teachers arithmetic was a very definite process of combining numbers to get a correct answer. They were conscious of the terms of "accuracy" and "speed" and as worried about them as the most of us were several years ago. They saw no romance in arithmetic. No survey test was given, for the situation was rather obvious and it was thought better to bring out crucial points in other ways. We were blindly teaching what the textbooks put before us with no idea of the very delicate difference between skills, concepts, habits, etc. We couldn't distinguish between an assignment which piled up difficulties in a haphazard fashion and one built according to definite specifications. We kept children fooled as long as possible and pulled out new tricks from a bag of magic at regular intervals. We slipped up on children with overwhelming tests to prove that we knew much more about arithmetic than they ever could. We blamed the teacher preceding us for not having successfully completed the "2's" in the second grade. Fortunately we got into the race when much research was going on and when the specialists were thinking arithmetically. We travelled close behind.

As I looked at the arithmetic situation from my desk in August, I came to these conclusions:

1. We had no up-to-date course of study in arithmetic but many authorities had agreed that certain things could be taught at certain grade levels. This was a starting point.
2. Our textbook was fundamentally sound for the most part but needed supplementing in certain important parts.
3. The teachers needed training in teaching arithmetic.
4. The children needed standards and goals to point the way.

As a supervisor, I knew myself rather than the classroom teacher to be responsible for good arithmetic teaching in the system. I knew, too, that no supervisor should operate on the basis of superficial judgment or casual observation, for supervision should be done in terms of numbers as well as any other producing agency.

I set up my first few mile posts. Two things I said first to my teachers were:

"When your group comes to you at the beginning of the semester,

take nothing for granted. Test to find out the skills they have. Begin there to teach."

"The tests we will use will be so constructed that you can put your finger on each child's difficulty and instruct him accordingly."

And two very definite accomplishments resulted:

1. A diagnosis of the group and their individual difficulties.
2. A dawning knowledge that there are many hidden difficulties within any one process.

Our next conference was about what we call the block system. We set up definite standards for children to reach. For instance, we laid the semester's work in multiplication facts before the 3B grade and blocked out the allotment for each of the three periods, not forgetting to work from the known to the unknown in every instance. Two laws were followed:

1. Teach well each new block.
2. Maintain all blocks which have gone before.

At the end of each block we test diagonally for the purpose of remedying a situation before it is too late. These tests also are the means for revising our basic material. The teachers and the children like the block system because it points the way to achievement. There really should be no mystery to arithmetic. There are certain things which we as adults know children need for their life outside the school, and why not lay the cards on the table before the children? Children should know where they are going and how close they are to the goal at all times.

A task which did test our ingenuity was that of remedial helps. We have remedial exercises, we have mimeographed lessons, we use flash cards, we have a supplementary single-copy textbook, in fact we have built everything to fit the situation and in some rooms you would find a fine library of remedial helps for the children built by the teacher. This, too, brought to the teacher the hidden difficulties. We use remedial exercises wherever we find a breakdown, for a *class basis*, or for an *individual report*.

I believe one of the most effective factors in the bringing of our arithmetic up to its present standard has been our drill work. With the two major uses of drill well in mind the teachers have accomplished much. At the end of each week a mixed fundamental drill is given the groups and a teacher's diagnostic record tells the story of the results of these drills to me and to themselves. We believe that mixed fundamental rather than isolated drills make it possible to use processes separately and together in any order. Too, we can find a breakdown in any one process rather easily so that the remedial work is very specific. The results from these tests furnish a diagnosis of weaknesses and special difficulties in need of immediate remedial work. A record is kept by the child of his own progress and a class record is also kept.

We like records in South Bend exceedingly. We have three:

1. The supervisor's record to the teacher of the city-wide progress.
2. The teacher's record to the supervisor of the progress of her grade.
3. The child's record of his own progress.

By these records I can tell in a short time where a teacher needs my help.

A supervisor must have adequate tools—diagnostic tests, remedial exercises, drills, and records—and the textbook. Fortunately no supervisor feels a serious lack there, for the outcome of the past few years of research and study shows itself in the new arithmetic textbook. I do wish every textbook could be a good course of study in itself so that the teacher could have under one cover the entire organization of her work. The supervisor is always responsible for the right material to be used, and where a textbook is not adequate she must supplement the material which is needed.

My teachers by this time were thinking arithmetically. In fact, I do not know of any other time that I have realized so fine a coöperation as in this arithmetic program. They began to evaluate the course of study in use, the textbook to question time allotments laid down for them by the powers, the social utility of some of the content, the reason for so little transfer, and, best of all, the difference between habits, skills, and concepts. In short, teaching of arithmetic became intelligent. The caution was, "Are we overemphasizing arithmetic?" Every test we have given, whether it be a pure arithmetic test or one of a battery of tests, show us shooting away above the mark in arithmetic. And it came to the place that, when I stepped into a room the teachers wanted to change their programs so that I might see what they had done in arithmetic. You see, they had found the romance in arithmetic. How much method should a supervisor lay down for her teachers? Would it be safe to say, as much as is necessary to reach certain aims, goals and purposes? The first principle of curriculum determination in arithmetic is: *Teach what is useful to average citizens in the everyday affairs of life.* Add to that, the principle that any method should facilitate initiative and self-direction by the pupil. Some facts I have found to be true in this arithmetic program have been such as the following:

1. That higher decade addition is a continuation of the primary addition facts and not a new process in itself.
2. That one should justify each multiplication fact and drill in random order.
3. That one method of subtraction can be used in a system.
4. That the first quotient figure must be taught well.
5. That the common denominator needs an exceedingly large amount of hard practice upon it.
6. That cancellation is not a process.
7. That rationalization is not necessary in many instances.
8. That every verbal problem needs analyzing with the class.

Many teachers have fit methods of their own for teaching skills. I never meddle with any which I see are going to reach the destination by a different road unless there is a *waste of time.*

At the end of the second year I was ready to put into some sort of a book our findings. We did not do this because of the state course then under construction. In a course of study we wanted the following:

1. Very definite skills, concepts, attitudes, and habits set up.
2. A suggested method of procedure to reach these.
3. A suggested list of materials for use in reaching these.
4. Time allotment by semesters.

Each teacher should have before her the plan for the semester's work and she should reach the outcomes as the situation demands, not by compartments of a six-weeks' period or a four-weeks' period, but as she best sees fit. Wherever there is a teacher who is a poor organizer of her time and work, that is the place for the supervisor to help her. After all, a supervisor is primarily a helping teacher. The things I want most in a teacher of arithmetic are: (1) knowledge of the needs of the child in his every-day life, so that she may separate the wheat from the chaff and not waste the child's time; and (2) knowledge of how to teach each difficulty according to its place in a definite specification so that she may place each block in the foundation properly and firmly.

Summary

1. The supervisor is responsible for good arithmetic teaching in a system.
2. She must have adequate tools.
3. She must supply her teachers with the right material.
4. She must help her teachers to see certain psychological factors in the learning of arithmetic.
5. She must build or be responsible in some way for a good course of study in arithmetic.

Supervision of Reading in the Elementary Schools

C. C. UNDERWOOD, Supervisor of Elementary Schools, Indianapolis

"SUPERVISION," according to the Eighth *Yearbook* of the Department of Superintendence, "is a creative activity. It has for its object the development of a professional group of workers who attack their problems scientifically, free from the control of tradition and actuated by the spirit of inquiry. It seeks to provide an environment in which men of high professional ideals can live a vigorous, intelligent and creative life."

In general we may say that the chief function of supervision is to further the learning and growth of pupils by improving the teaching act thru improvement of teachers in service.

Many attempts have been made to catalog the functions of supervision. Up to the present time there is no list that is universally accepted. However, the following are considered the outstanding functions of this important activity.

This activity has to do with inspection and observation. With reference to our problem it means the gathering of data which may form the basis of a corrective or a constructive program or may be used as information to measure the progress that has been made in reference to previous efforts. By observation and inspection the investigator gathers the facts which enable him to diagnose conditions and discover problems for solution.

Supervision also includes research—that is, the discovery and isolation of problems; the identification, organization, and interpretation of facts; the formulation of hypotheses; and the testing and appraisal of their uses and value.

Still further, supervision is concerned with the training of teachers. I hardly think that there is anyone here who will take exception to the statement that the primary function of all supervision is to improve the teacher in service and by so doing to improve the quality of instruction which is the ultimate goal of all supervisory activity.

The materials used, the techniques, methods, and devices employed in teaching reading have been discovered thru long experience in teaching, experimentation, and research, and there must be someone, either superintendent, supervisor, principal or expert, to demonstrate and explain their use. It remains that there must be guidance to bring about the best understanding and use of the materials and methods so that the whole program may achieve the most desirable outcomes.

There are many other activities that properly belong in the field of

supervision, but these four—inspection, research, training, and guidance —are the most fundamental.

At this point we might ask who should be a supervisor of reading? What are some of the necessary qualifications? The answers to these questions are so self-evident that it hardly seems necessary to say anything about them. I think, however, we can say that the principal qualifications are that he must possess a thoro and up-to-date knowledge of the subject-matter; that he must have an understanding of the principles of supervision; and that he must not only understand these principles, but must know how to apply them to the teaching of the subject that he is supervising. He must be a master of technique in observing classroom activities, in directing demonstration teaching, in directing and holding conferences, in criticizing constructively, in leadership, in winning the confidence of teachers, in bringing about coöperation and unity, and in getting across the idea that he is not an inspector as such but a helper. He should be able to answer intelligently and satisfactorily all reasonable questions pertaining to his subject. For example, the supervisor of reading may well expect to meet with many such questions as the following: What must be done for the child who has a tendency to spell out words? How may the child be helped to overcome the habit of repeating reading? How may proper phrasing be secured, thereby eliminating the tendency to call out words?

He should know and have a clear understanding of the aims of reading instruction, such as are set forth in the Third *Yearbook* of the Department of Superintendence.

Having defined supervision from a general standpoint, and having briefly discussed its nature and purpose and noted some of the essential qualifications of a supervisor, we may now turn to the subject of our discourse—The Supervision of Reading in the Elementary Schools. In thinking the problem over it was difficult for me to decide what phase of the supervision of reading I should attempt to discuss. I finally decided to attempt to outline what is considered the essential characteristics of such a program. The first essential is that the program should be carefully planned.

In this day and age an activity that is of any importance, if successfully carried out, must be carefully planned. We are living in an age of intensified organization in the business world, and the same is true in the educational world. It is easily demonstrated that all school activities are carried out more successfully and effectively when a program of guidance has been prescribed. Present practices show that this is particularly true with regard to supervision. In all school activities there is a point of departure and destination. The supervisor without a plan will have neither of these. There must be some way to measure results. The objectives to be attained must be clearly stated and methods must be used by which the expected outcomes in reading may be realized. A great deal of ineffective supervision exists because supervisors have failed to make clear-cut definite plans.

A survey in the field of supervisory programs for teaching reading in the elementary schools will, of course, reveal the fact that they all differ in minor details. No two people will plan their work the same.

There will be as many different plans as there are supervisors, different situations, different communities, large and small. The nature of the problem and the difficulties to be overcome, the number of people on the supervisory staff and the kind of outcomes desired, will condition the nature and planning used. But from this survey you would find, regardless of the kind and nature of the subject, that each carefully planned program would have three fundamental characteristics in common:

First, they would all provide for the determination and selection of definite objectives. In other words, they would state the point of departure. The problems would be definitely and clearly stated.

Second, having selected and clearly stated the objectives, a clear-cut outline of the means, devices, and procedures to be utilized in the attainment of the ends are to be decided upon.

Then, as a third step, it would provide for the formulation of a clear-cut outline of the criteria, checks, and tests to be applied to teaching and supervision in order to determine the success or failure of the program. To my mind, while the other two steps are necessary, this last step is the most fundamental.

Now, having stated the necessary steps in planning a campaign for the supervision of reading, the next problem is to determine what the objectives should be and how to decide upon them. Of course, the first thing to do is to get the facts concerning the status of reading in the particular situation. Our objectives must be selected in terms of the actual situation. These data can be obtained by a study of the outcomes of instruction in reading as represented in the results of a testing program. But if you do not believe in tests, then their determination may be based on a field survey of instruction itself. There are many other ways in which the necessary facts may be determined, but the two mentioned are the ones that are most commonly used. Time will not permit giving the details of how these objectives may be determined nor the techniques used. I would refer you to the Second *Yearbook* of the National Conference of Supervisors for extended details used in survey methods. But a field survey, regardless of the kind used, should give you an actual picture of the situation. It should also point out the defects of the existing program.

From the facts thus gained the situation can be analyzed. The outcomes that are important in the teaching of reading that are not being provided for, as well as the reading activities that are not being done effectively, should be selected as objectives. For example, does a study of the conditions show that the reading in the system is purposeful? It is a settled fact that all good reading programs provide that all reading should be purposeful. Scientific investigations have proved that the reader's purpose controls and directs the attention and has much to do with the mental processes involved in reading. Just how valuable reading is from an educative standpoint depends upon the purposes back of it. The good teacher of reading will cultivate in the minds of her children a desire for reading by facilitating the discovery and realization of worth-while reading purposes. Do the facts show that the instruction given in reading is related to the interests, abilities, and

needs of the individuals who make up the class? Do the reading activities lead to the development of abiding attitudes towards reading as well as effective reading habits? Do the facts show that there is a careful and continuous study of the pupils' needs and interests to provide for the proper adjustment to individual differences? The progressive teacher determines his program to improve instruction by means of checks on attitudes and habits and by means of tests for rate of reading and comprehension. Do the facts show that there is a suitable supply of materials that will offer a rich and varied content which will take care of all possibilities of reading in our modern civilization?

Do the facts show that the normal pupil by the end of the sixth year can read well enough to be able to do effective study under the guidance of a teacher? Dr. Morrison, in his efforts to define the meaning and function of pre-secondary education and to determine when secondary types of instruction should begin, says that the pupil has reached that point when he has mastered the following learning products: (1) ability to read his vernacular understandingly, (2) ability to use the fundamental concepts of numbers, and (3) ability to use the universal system of expression which we commonly call handwriting.

In our present discourse we are concerned only with the first of these, the ability to read understandingly and well enough to study. Dr. Morrison is very specific in his answer to the question of what constitutes the kind of reading that qualifies for study. He says, "Reading is the ability to see through the symbolic complex of the printed page to the thought or scene or action which is the subject of discourse, without constant consciousness of the discourse itself." In other words, the pupil possesses the ability to study when he is able to reflect as he reads and, consequently, to assimilate subject-matter. "The person who has not arrived at this stage simply puts together when he 'reads' a mosaic of words of each of which he is focally conscious. Under these circumstances he can neither reflect nor assimilate as he reads, and therefore is unable to study." According to Dr. Morrison, every normal child should be able to study, by his own efforts, well enough by the end of the sixth year to get knowledge and information from books and to have acquired the skill and ability to rise above technique, so that he thinks, as he reads, entirely preoccupied by content and meaning and entirely unaware of the technique of reading. I fully believe that what Dr. Morrison advocates can be done, and that the consummation of this desirable outcome should be one of the general major objectives of the first six years.

And so, as I said before, the desirable aspects of reading that the present program does not provide for or those activities that are taught ineffectively should be selected as the objectives of our reading program. Care, however, must be taken not to select too many for improvement at one time. From the list, only a few of the most important should be selected for immediate attention.

The next step is to decide upon the means for achieving the objectives chosen. Just what the program will be and the methods used will be determined more or less by the objectives themselves. The techniques used must be clearly defined and carefully explained so that

everyone taking part will be sufficiently informed to use them intelligently and effectively. Some of the most important and effective methods that are available for carrying out this part of the program are: experimenting or doing research work, either by individuals or organized groups of teachers; organizing committees for curriculum revision; using the results of diagnostic testing, and planning remedial teaching and corrective work; and instructing the teaching corps in giving and using tests, both informal and standardized, diagnosing the pupils' difficulties, and, on the basis of this diagnosis, giving remedial work. Call the teachers together in small groups for the purpose of explaining the objectives and discussing the difficulties and problems as they come up. Furnish a bibliography of reading for study by the entire corps. The teachers will thus gain a clear realization of the different aspects of the reading situation and purpose of each particular aspect. All the teachers and especially the organized groups should be given a mimeographed list of all the scientific investigations that have been made in the field of reading. There have been over five hundred such investigations made in the United States during the last thirty years.

Classroom visitation should be carried on in a carefully organized manner. Each visit should be followed by a conference between supervisor and teacher. These visits should be made on schedule or call. Plans should be carefully organized for demonstration teaching to be done by the skillful and efficient teachers of the teaching staff. Both observation and demonstration should be carefully directed. If this is not done the purpose of the demonstration lesson is not always realized. There should be a group of teachers observing at the same time, together with their supervisors and principals. At the close of the demonstration lesson this group, including the demonstrating teacher, should meet immediately for a conference. It is very desirable that the teachers' supervising principals be present with them at the demonstration so that in the future the principal may help and guide the teacher in carrying out the purposes of the demonstration in her regular classroom work. The demonstration lesson can be used for many purposes, such as for the explanation and use of new materials and devices, and of proposed methods for the adaptation of materials, methods, and devices to individual differences. I firmly believe in demonstration for all classes of teachers—old and young, experienced and inexperienced. Its purpose perhaps is best suited for the training and improvement of inexperienced and problem teachers. I have dwelt at some length on this device because I believe that it is among the best, if not the best, means of carrying out this second aspect of a supervisory program of reading in the elementary schools.

We now come to the third and last phase. Having selected our objectives and having decided upon the means by which the objectives may be realized, our next step is to determine the criteria for evaluating the outcomes. There is no set of criteria that can be used in testing the results of a program as a whole. The nature of the objectives may be such that the evaluation of each may require a different method and kind of criteria. For example, this would be true in the

case of objectives involving the discovery of individual differences in learning to read and the application of remedial measures to overcome them, such as mispronunciation, substitution, frequent halts and hesitation during oral reading, word calling, poor span of perception, slow rate of reading and comprehension, etc.

From this evaluation certain results should be outstanding. The program should have set up definite standards of reading. It should show that many of the weak points have been corrected and improved thru remedial work. The teacher should have developed a keener sense of the importance of reading. The chief objectives for teaching reading as set forth in the Twenty-fourth *Yearbook* of the National Society for the Study of Education should be clear in the mind of the teacher. The spirit of investigation should have been inculcated in his mind. He should have become acquainted with the most important scientific investigations that have been made and the contribution that these studies have made for better understanding of children and for improvement in methods of teaching. He should have acquired a knowledge of and a skill for giving tests and scoring them. He should realize the importance of remedial work. He should recognize the fact that all reading should be purposeful and that his chief work as a teacher is to cultivate in the minds of the children desirable purposes for reading. He should know that in good reading attitudes and habits go hand in hand and should be developed simultaneously. He should have caught the spirit of an expert salesman, selling the idea that reading is the most important factor in the curriculum, that it is the foundation necessary for all study. And last of all, the work of the program should have developed a splendid type of teamwork thruout the entire personnel for securing good results in teaching reading.

List of Bulletins in the Field of Education, Indiana University

The following is a list of the bulletins published by the School of Education, Indiana University.

All bulletins which are available at the present time can be secured thru the University Bookstore for fifty cents ($.50) per copy, with the exception of the *Second Revision of the Bibliography of Educational Measurements*, and the *Bibliography on School Buildings, Grounds, and Equipment*, which can be secured thru the Bureau of Coöperative Research, School of Education, for seventy-five cents ($.75) per copy.

Proceedings of the High School Principals' Conference (November 23 and 24, 1923). Vol. I, No. 1, 1924. 85 p. (Supply exhausted.)

Investigation of Nursing as a Professional Opportunity for Girls. Part I, Technical Study; Part II, Vocational Information Bulletin. By Florence E. Blazier. Vol. I, No. 2, 1924. 69 p.

Proceedings of the Eleventh Conference on Educational Measurements. Vol. I, No. 3, 1925. 141 p.

Proceedings of the High School Principals' Conference (November 14 and 15, 1924). Vol. I, No. 4, 1925. 49 p. (Supply exhausted.)

First Revision of the Bibliography of Educational Measurements. Compiled by the Bureau of Coöperative Research. Vol. I, No. 5, 1925. 147 p. (Supply exhausted.)

Proceedings of the Twelfth Conference on Educational Measurements. Vol. I, No. 6, 1925. 76 p.

The Effect of Population Upon Ability to Support Education. By Harold F. Clark. Vol. II, No. 1, 1925. 28 p. (Supply exhausted.)

Proceedings of the High School Principals' Conference (November 20 and 21, 1925). Vol. II, No. 2, 1925. 77 p. (Supply exhausted.)

A Cross-Indexed Bibliography on School Budgets. By Harold F. Clark. Vol. II, No. 3, 1926. 66 p.

A Comparison of the Results Made on Certain Standardized Tests by Pupils in the Bloomington High School Who Were Taught in Classes of the Same Grade by University Student Teachers and by Regular High School Teachers. By Carl G. F. Franzén. Vol. II, No. 4, 1926. 19 p.

Proceedings of the Thirteenth Annual Conference on Educational Measurements. Vol. II, No. 5, 1926. 103 p.

When to Issue School Bonds. By Harold Florian Clark and Paul Royalty. Vol. II, No. 6, 1926. 16 p.

Students' Attitude Toward Examinations. By Grover T. Somers. Vol. III, No. 1, 1926. 48 p.

Proceedings of the High School Principals' Conference (November 12 and 13, 1926). Vol. III, No. 2, 1926. 27 p.

Index Numbers in School Administration. By Harold F. Clark. Vol. III, No. 3, 1927. 35 p.

Topical Analysis of 234 School Surveys. Compiled by the Bureau of Coöperative Research. Vol. III, No. 4, 1927. 111 p.

Proceedings of the Fourth Annual Conference on Elementary Supervision. Vol. III, No. 5, 1927. 64 p.

Proceedings of the Fourteenth Annual Conference on Educational Measurements. Vol. III, No. 6, 1927. 66 p.

Some Phases of the Junior College Movement. By I. Owen Foster, Harold F. Clark, Willard W. Patty, and Leo M. Chamberlain. Vol. IV, No. 1, 1927. 125 p. (Supply exhausted.)

Second Revision of the Bibliography of Educational Measurements. By Henry Lester Smith and Wendell William Wright. Vol. IV, No. 2, 1927. 251 p.

Bibliography on School Buildings, Grounds, and Equipment. By Henry Lester Smith and Leo Martin Chamberlain. Vol. IV, No. 3, 1928. 326 p.

Proceedings of the High School Principals' Conference (November 18 and 19, 1927). Vol. IV, No. 4, 1928. 54 p.

The Economic Effects of Education. By Harold F. Clark. Vol. IV, No. 5, 1928. 39 p.

Proceedings of the Fifteenth Annual Conference on Educational Measurements. Vol. IV, No. 6, 1928. 73 p.

Proceedings of the Fifth Annual Conference on Elementary Supervision. Vol. V, No. 1, 1928. 54 p.

Proceedings of the High School Principals' Conference (November 16 and 17, 1928). Vol. V, No. 2, 1928. 33 p.

The Development and Use of a Composite Achievement Test. By Wendell William Wright. Vol. V, No. 3, 1929. 90 p.

An Analysis of the Attitudes of American Educators and Others Toward a Program of Education for World Friendship and Understanding. By Henry Lester Smith and Leo Martin Chamberlain. Vol. V, No. 4, 1929. 109 p.

Tentative Program for Teaching World Friendship and Understanding in Teacher Training Institutions and in Public Schools for Children Who Range From Six to Fourteen Years of Age. By Henry Lester Smith and Sherman Gideon Crayton. Vol. V, No. 5, 1929. 54 p.

Proceedings of the Sixteenth Annual Conference on Educational Measurements. Vol. V, No. 6, 1929. 96 p.

Proceedings of the Sixth Annual Conference on Elementary Supervision. Vol. VI, No. 1, 1929. 73 p.

An Analysis of the Duties of County School Superintendents and Superintendents of Schools in Certain Cities in Indiana. By Henry Lester Smith and Leo Martin Chamberlain. Vol. VI, No. 2, 1929. 94 p.

Proceedings of the High School Principals' Conference (November 22 and 23, 1929). Vol. VI, No. 3, 1930. 51 p.

Coöperative Studies in Secondary Education. By Henry Lester Smith and Carl G. F. Franzén. Vol. VI, No. 4, 1930. 121 p.

Proceedings of the Seventeenth Annual Conference on Educational Measurements. Vol. VI, No. 5, 1930. 103 p.